DOCUMENT RESUME

ED 469 327 EF 006 148

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TITLE	A Feasibility Study for Model School Design Plans. Report of the Department of Education to the Governor and the General Assembly of Virginia. Senate Document.
INSTITUTION	Virginia State Dept. of Education, Richmond.
SPONS AGENCY	Virginia State General Assembly, Richmond. Senate.; Virginia State Governor's Office, Richmond.
REPORT NO	VA-Senate-Doc-8.
PUB DATE	2002-00-00
NOTE	87p.
AVAILABLE FROM	Full text: http://legis.state.va.us/.
PUB TYPE	Reports - Research (143) -- Tests/Questionnaires (160)
EDRS PRICE	EDRS Price MF01/PC04 Plus Postage.
DESCRIPTORS	*Building Plans; Construction Costs; Design Requirements; *Educational Facilities Design; Elementary Secondary Education; Feasibility Studies; School Buildings; State Standards
IDENTIFIERS	*Model Schools; *Virginia

ABSTRACT

Virginia Senate Joint Resolution No. 400 requested the Department of Education (DOE) to study the feasibility of the commonwealth providing model school design plans for elementary, middle, and high schools. The resolution further requested input from school divisions and other interested persons. As a result of this request, a sample of school division superintendents, educational facility planners employed by school divisions, architects, and engineers were surveyed relative to their positions on the feasibility of providing such plans.The survey asked about the feasibility of providing such plans, whether or not the commonwealth should do it, and the possibility such plans might have for providing economies for school divisions. In addition, the respondents were asked about the impact model plans might have on community involvement in the planning process. The use of prototype school building plans also was investigated. The results of the survey indicated that there was not a clear picture on the use of model school plans. The superintendents and educational planners believed such plans might be feasible and useful, but the architects and engineers thought differently. The majority of all group respondents believed model school plans developed by the state would not fit the educational needs of a school division. Further, there was some concern that if such plans were used, community involvement in the planning process might be limited. (Appendices contain school divisions surveyed, survey instruments, comments, DOE facilities cost data, recommended prototypical space programs, and Resolution No. 400.) (EV)

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A Feasibility Study for Model School Design Plans [1]

TO THE GOVERNOR AND THE GENERAL ASSEMBLY OF VIRGINIA

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COMMONWEALTH of VIRGINIA

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November 30, 2001

The Honorable James S. Gilmore, III, Governor
Members of the General Assembly of Virginia
State Capitol Building
Richmond, Virginia 23219

Dear Governor Gilmore and Members of the General Assembly:

I am pleased to transmit a report prepared by the Department of Education pursuant to Senate Joint Resolution 400 of the 2001 General Assembly of Virginia. This resolution requested the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools, and to submit its findings and recommendations by November 30, 2001, to the Governor and the 2002 Session of the General Assembly.

If you have questions or require additional information relative to this transmittal, please do not hesitate to contact me or Dan Timberlake, assistant superintendent for finance, at (804) 225-2025.

Sincerely,

Jo Lynne DeMary

Jo Lynne DeMary

JLD/je
Enclosure
Cc: The Honorable Wilbert Bryant, Secretary of Education
Mr. Kirk T. Schroder, President, Virginia Board of Education

Preface

Senate Joint Resolution No. 400 requested the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools. The department contracted with Dr. Glen Earthman, professor emeritus, at Virginia Polytechnic Institute & State University, to develop a survey instrument and gather information from a broad range of interested parties, and to review data on existing school facilities constructed in recent years. Dr. Earthman organized and analyzed this information and prepared a written report on his findings and recommendations.

The report was reviewed by the Department of Education, organized to comply with the Division of Legislative Automated Systems requirements, and submitted to the Governor and the 2002 Session of the General Assembly on November 30, 2001.

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Executive Summary

Senate Joint Resolution No. 400 requested the Department of Education (DOE) to study the feasibility of the commonwealth providing model school design plans for elementary, middle, and high schools. The resolution further requested input from school divisions and other interested persons. As a result of this request, a sample of school division superintendents, educational facility planners employed by school divisions, architects, and engineers were surveyed relative to their positions on the feasibility of providing such plans.

The survey asked about the feasibility of providing such plans, whether or not the commonwealth should do it, and the possibility such plans might have for providing economies for school divisions. In addition, the respondents were asked about the impact model plans might have on community involvement in the planning process. The use of prototype school building plans also was investigated.

The results of the survey indicated that there was not a clear picture on the use of model school plans. The superintendents and educational planners believed such plans might be feasible and useful, but the architects and engineers thought differently. The majority of all group respondents believed model school plans developed by the state would not fit the educational needs of a school division. Further, there was some concern that if such plans were used, community involvement in the planning process might be limited.

During the process of gathering data from the survey, respondents provided commentary about the use of such plans. These comments provided insights into several problems the commonwealth might face if model school design plans were implemented. Perhaps the most important problem was the educational program for which the school plans would be designed. Most respondents felt that it would not be possible to develop models plans that would fit the needs of a locality and that the re-design might increase the total cost to obtain architectural plans for a school. The matter of architect/engineer liability entered into this problem because all of the decisions made on the original model school design plans would have to be re-visited by the architects and this would include all of the calculations and specifications. The architects seemed to feel this would add to the overall cost of producing documents that could be used for bidding purposes.

Perhaps the most pressing problem would be trying to decide what educational program would be the basis of the needed specifications that would be used to prepare the model school design plans. There is not a standard educational program beyond the minimum basic requirements specified in the Standards of Quality and the Standards of Accreditation that would be representative of all school divisions around the State. It is the additional program offerings that each school division develops to meet their needs and goals that expand the minimum requirements to a unique program in each school division.

Another problem in trying to provide model school design plans is related to the size of the building. One set of model school design plans would not be sufficient to address the variety of sizes of school buildings needed. The Department of Education has developed 16 different sets of space recommendations for schools of different sizes. Any model school design plans would have to address this need. As a result, any economies would result only if more than 16 schools were constructed from these plans. The history of the use of model school design plans has been that such plans are typically not used by a local school system.

Community involvement in the planning process of new schools was an issue in the survey; superintendents and educational planners were divided in their thoughts about this issue. The architects and engineers were adamant about their feelings that the use of such plans would indeed limit community planning. The thought was that if a school division is using a model school plan, there is little reason for new input from parents.

Almost all respondents assumed the reasoning behind the use of model school design plans was that some economies would accrue. Some believed there would be no savings, and in fact the cost would be more than what originally developed plans would cost. The fee charged for the development of the model school design plans would simply be a shifting of the cost from a school division to the commonwealth. The architects and engineers stated that their fee for re-design to fit the new site and the local educational program would more than offset any possible economies.

Senate Joint Resolution No. 400 requested a determination of the feasibility of the commonwealth providing model school design plans for elementary, middle, and high schools. Providing such plans to school divisions is indeed technically feasible. The real issue, however, is whether or not such plans would be used or accepted by the school divisions. The evidence points to the belief that such plans would not be used or accepted because they would not meet the needs of the local educational program. In addition to this, there are some major problems associated with the use of such plans that would more than likely negate any possible savings that would be realized. The only savings with model school design plans would be in the architectural fee, which is a small percentage of the total cost of a building, but again, the preponderance of evidence would indicate there would not be any savings.

Introduction

Purpose of Study

The 2001 General Assembly passed a resolution requesting the Department of Education to study the feasibility of the commonwealth providing model school design plans for elementary, middle, and high schools. The intent of this legislation was to determine whether or not the idea of model design plans for schools would be a viable means for reducing the total cost of providing safe and modern school buildings throughout the commonwealth. An additional part of the legislation was to explore common components of school buildings as a necessary step for establishing a model school design. Further, an analysis of construction costs of schools, submitted to the Department of Education over the past few years, was stipulated. The resolution also requested an examination of legal issues relating to procurement of a set of model plans for schools on all levels. Lastly, the study was to be conducted using the input from a wide variety of constituent partners and architects who have an interest in educational facilities. These include division superintendents, educational facility planners employed by school divisions, architects, and engineers. In addition, professional organizations representing architects and engineers were contacted for their input. To meet the requirements of this study, the Department of Education contracted with Virginia Polytechnic Institute and State University (VPI & SU) to produce this report.

Definitions

Model School Design Plans – The resolution did not define this term. Because of that, a common definition was used for the study. Model School Design Plans are defined as being a set of common architectural plans of school buildings for elementary, middle, and high school levels that have been drawn and developed for the commonwealth. The intent of such plans is that many school divisions will use them in an attempt to reduce the total cost of constructing a school. The definition of the Model School Design Plans can assume the plans are developed to either the schematic or the contract document stage. Because the resolution was silent regarding the definition of the term, the study did not define the development stage of the plans.

Stock Architectural Plans – Plans of this nature are usually thought of as architectural plans developed by the state for use by the local school system. Several states have used such stock plans with minimal success. Even the Commonwealth of Virginia at one point in time had stock plans for school buildings.

Prototype Plans – Such plans are usually thought of as being architectural plans developed by a school division that can be used repeatedly in several geographical locations in the division. Prototype is normally associated with a school division and usually not thought of on a statewide basis.

Voluntary/Mandated Use – The question of whether or not the architectural plans developed by the state must be used by school divisions is always present in discussions of model school design or stock plans. This question is probably at the heart of the matter of use in the mind of the local superintendent and school board. If the use of model school design plans is voluntary for school divisions, then this is not perceived as a threat to local choice and the school division can plan the type of school building the community desires. The legislative resolution did not address this question. As a result, the survey instrument did not mention whether or not use of the plans would be voluntary or mandatory.

Experience with State Standardized Plans

Various states have experimented with the use of standard or stock architectural plans for school buildings throughout the last century. As recently as 1953, ten states reported some limited use of standardized plans to build schools (American Architectural Foundation). In fact, Virginia is one of the few states that have in the past used this vehicle for schools. According to the report, many states have stopped using such plans.

According to a report by the Georgia Department of Education, only three states reported that they had used standard or stock plans in the recent past. These states are Maine, New York, and Virginia (GDOE, 1991). In a completed survey of data regarding the development and use of standard plans, the Georgia Department of Education reported that none of these states currently use such plans. The survey included the state departments of education of the 50 states, plus the 184 school superintendents in Georgia. The purpose of the study was to determine if any state or any public school system in Georgia has ever used or is currently using standard plans for construction of new schools.

The report also said that all three of the above states recommended against using standard or stock plans for the construction of schools. Nine states responded that their legislatures had requested data regarding the feasibility of developing and using standard plans. These states, however, are not currently using such plans nor do they intend to do so in the future.

In response to an inquiry from the above study, the State Education Department of New York sent a letter describing that state's experience with standard plans (Baltzel, September, 1991). In 1960 the legislature passed legislation to have standardized school plans developed. In fact, 18 separate school plans were to be prepared. In actuality, only nine sets of plans were developed. Only two school buildings were actually constructed using these standard plans. The staff of the New York Department of Education did not consider the program successful because of the limited number of schools built using the plans. In identifying some of the problems in using standard plans, the following statement was used:

> *"In the original concept, it was believed that stock plans would result in reduced architect's fees, reduced construction costs and more rapid construction. This did not prove to be so, in that the first school was built at an architect's fee of 6%. In general, architects approach to use of these plans would not reduce their fee to less than 4.5%, even if no changes were to be made. Construction costs proved to be about the same as for custom designed buildings and the time of construction was not reduced" (Baltzel, September, 1991).*

Based upon this experience, school systems apparently did not realize the purported savings in design fees.

Other considerations were given in a position paper developed by the Administrative Services Committee of the Georgia State Board of Education (1990). These points are:

- Required standardized plans and specifications will eliminate local school system input from the facility planning process.
- Standardized plans and specifications will by necessity be based on minimum requirements thereby producing school facilities similar in concept to those of the 1950s.
- Standardized plans and specifications will not allow adaptability for a local school system's instructional strategies or programs.
- Standardized plans and specifications will not permit a local school system to construct school facilities that are unique to the system (loss of identity).

The recommendation of this body was to reject the use of standardized plans for the construction of public schools. At the present time, it was reported that no state department of education is actively using stock or standardized plans as a format for all school systems to use throughout the state.

Methodology

Sample Selection

The resolution agreed to by the Virginia General Assembly requested input from school divisions, architects, and other interested groups. As a result, a list of school divisions was developed to solicit such input. The list of school divisions included those that had on-going capital improvement programs that involved the construction of new schools on a regular basis. The logic behind this was that these school divisions would be the ones most likely to use such plans. The list also included those school divisions that did not have an on-going capital improvement program and did not have need for new schools on a regular basis. This latter group of school divisions might build a new school for replacement purposes, but not necessarily because of growth in the number of students. This segment represented mostly small, rural school divisions. A mix of county and city school divisions was included in the sample. Table 1 contains data about the representation of the sample school divisions. A complete list of the school divisions that were included in the sample is provided in Appendix A.

Table 1
Distribution of Sample School Divisions

Geographical Area	Superintendents	Facility Planners
Tidewater	3	5
Northern Virginia	5	5
Richmond Area	5	5
Southwest/Southside	6	5
Roanoke Area	4	1
Charlottesville Area	1	2
County School Division	14	15
City School Division	9	5

The sample of architectural firms to be included in the survey was derived from a list of those that do the majority of school building design in the commonwealth. Twenty architects were originally selected from the list for participation. This group represented every geographic region of the commonwealth. Additional architects requested to be included in the survey and were sent questionnaires. In addition, the Virginia AIA contacted its members for their input by completing a survey instrument. A list of educational facility planners was developed by culling names from attendees at professional facility planning meetings. The list consists of individuals employed by school divisions who are responsible for planning school facilities. The exact titles of these individuals range from assistant superintendent of operations, director of

construction, facilities manager, to project manager. All individuals, however, deal directly with providing facilities for students. The individuals represent various geographical regions of the commonwealth and county and city school divisions. The Virginia Society of Professional Engineers was contacted to help provide input from members who have had experience in providing engineering expertise for development of school plans. The survey instrument was sent to the members electronically to obtain their input.

Instrument Development and Data Gathering

In order to obtain input from school divisions, architectural/engineering firms, and planning experts, data-gathering instruments were developed. Two separate instruments were developed, one for school division superintendents and educational planners and another for architects and engineers. Each questionnaire requested a response on a variety of issues related to the possible use of model school design plans. These issues revolved around: (a) the possible use of such plans by a school division; (b) how such plans would meet local needs; (c) the impact these plans may have on community involvement in planning; (d) experiences of school divisions in the use of prototype buildings on the local level; and (e) the desirability of model school plans that might be developed by the commonwealth. Copies of the two questionnaires are contained in Appendix B.

The questionnaire developed for architectural/engineer firms included items relating to the above issues. They were also asked about their experience in developing prototype-building plans. In addition, items concerning liability in using model school design plans were included in the instrument developed for that group of respondents.

A questionnaire instrument consisting of items covering the above areas of interest was developed and submitted to the staff of the Department of Education for review. Changes and suggestions were incorporated into a revised instrument that was again submitted for staff review.

The final revision of the questionnaire was used to obtain input from the four groups of individuals. The questionnaire was to be delivered to the division superintendents electronically with a response requested via email to facilitate the returns. All of the email addresses of division superintendents were available through the membership list of the Virginia Association of School Superintendents.

Electronic addresses for educational facility planners and architect/engineers were not so readily available. Only half of the electronic addresses of architects and planners were available through lists of attendees at various professional meetings. As a result, half of the individuals in the architect and planners groups were delivered the questionnaire through electronic means. The remaining half of the sample groups received the questionnaire through the regular mail service. Questionnaires for the engineers were distributed through the Virginia Society of Professional Engineers and the Consulting Engineering Council of Virginia.

There were several cases where the electronic address of individuals was not current or valid. When the electronic message was returned to the researcher a questionnaire was mailed to them.

The initial request for input was mailed to the individuals in the three sample groups during the last week of August. Returns were received through the third week of October. Fifty responses were received from the original sample of 65 individuals and firms, which represented a 77 percent return of the total of all groups. Twenty-three superintendents were sent a questionnaire and 17 responses were received for a 74 percent return. Twenty educational facility planners were sent questionnaires with 15 returns for a 75 percent return. The initial group of architectural firms numbered 20, but several architects not in the initial group requested to be included and were sent questionnaires. In addition, several architectural firms sent multiple responses that increased the original number of respondents. There were several instances where duplicate responses were received from a single firm. All duplicate responses were discarded from the item responses. The total number of architectural firms in the original group that received questionnaires was 24 and 17 questionnaires were returned for a 71 percent return. A great number of individual architects not on the original list returned questionnaires, increasing the total number of responses to 62. In addition, two architects sent comments about the development of model school design plans, but did not complete a survey instrument. All of these responses were included in the percentage calculation for each item on the instrument. Responses from members of the engineering profession were received by both e-mail and regular mail.

Survey Results

The joint resolution requested input from various groups of individuals who are concerned with educational facilities. Specifically, input from school division superintendents was requested. In addition, planning experts and architects/engineers were identified as other sources of input. The four groups identified became the population of the study. A separate survey instrument was developed for the architects and engineers because of the need for additional information related to their activities in designing school buildings. This instrument also contained some questions asked of the educators. This was done for comparison purposes. The survey instrument for the superintendents and educational facility planners employed by school divisions contained identical questions.

The survey instrument for the superintendents and educational facility planners contained 15 questions, plus one question asking if they could be interviewed. All of the questions dealt with the feasibility of using model school design plans, the impact such plans would have on community involvement in planning, experience in prototype building plans, and the desirability of having the commonwealth provide such plans.

The survey instrument for the architects/engineers contained 15 items, including some of the same questions on the educator's instrument. In addition, architects and engineers were asked about their experience in developing prototype-building plans for school divisions, the degree of involvement in designing school buildings, and their concern about liability in using such plans.

The aggregated results of the survey instrument are reported as percentages of individuals who responded. The responses for each question are recorded as a percentage of the whole, which would equal 100 percent. The percentages for some questions may not equal 100 percent because some of the respondents did not reply to every question. This lowered the response rate for that particular question because the return was based upon the numbers in the sample. In addition, because of the small number of engineer respondents and the rounding of fractions on individual responses, the responses from this group most often equal more than 100 percent. Because of the difference in the number of responses received from each group, reported percentages may differ slightly.

The first set of questions sought input about the thinking of superintendents, educational facility planners, and architects/engineers regarding the advantages and disadvantages of model school design plans. The advantages centered on possible savings of funds and time of design in using such plans and the impact such plans might have on the community. Likewise, the listed disadvantages identified possible costs of such plans, the compatibility of model school design plans with local educational needs, and the receptivity such plans might or might not have with the community. The results of the respondents are shown in Table 2. The items in these questions have been shortened to accommodate the table format.

Table 2

Advantages and Disadvantages of Model School Design Plans

	Supt. %	Planner %	Architect %	Engineers %
Advantages				
Savings in overall cost of new buildings	71	80	17	34
Quicker completion of the building project	41	53	28	23
Community would appreciate model school plan	12	27	11	23
Community would have confidence in quality	6	20	6	23
There are savings in design time for model design	12	0	50	45
Other	6	33	28	0
Disadvantages				
Model plans do not fit our education needs	59	60	88	67
Model schools are no more cost effective	0	6	88	56
Community would not feel they owned schools	59	53	88	67
Community would not accept plans from state	12	27	17	12
Community might feel schools not same quality	29	20	45	23
Other	12	53	56	23

Copies of the survey instruments are contained in Appendix B and should be referred to for the complete text of the questions.

Review of the data contained in the table indicate the superintendents and facility planners believe savings could result from the use of Model School Design Plans, whereas only a minority of architects and engineers agree. There is considerable difference between the responses of the superintendents and planners and those of the architects and engineers on this item. Support for the remaining items in the advantage column is rather weak among all four groups. Approximately 53 percent of the planners, however, think that a building maybe completed quicker by using model school design plans. About 50 percent of architects believe there could be some savings in design time on the local level by using state supplied plans. Only 45 percent of the engineers supported this idea. A small number of superintendents, planners,

architects, and engineers suggested some other advantages than those listed. These comments centered on the possibility that state requirements would be accommodated in such plans and would not be left to chance. Specific comments were:

State-mandated programs could be included.
Assist school divisions without facility planning staff.
State requirements would not be overlooked.
May help as a guide.

Data concerning the disadvantages of model school design plans show that the majority of superintendents and planners believe the plans would not fit the educational needs of a school division if model school design plans were used. Further, they do not think the citizens in a community would feel they owned the buildings. The architects and engineers believe very strongly that the model school design plans would not fit the needs of a school division, nor would schools built from such plans be any more cost effective than buildings constructed from originally drawn plans. The architects/engineers support the superintendents and planners in believing the community would not feel it owned the buildings. Their belief is, however, much stronger than the educators.

At least a majority of the planners and architects indicated there were other disadvantages than those listed. In this category, most of the comments elaborated on the idea of nonacceptance of model school design plans by the community or the model school design buildings not meeting local educational program needs. Some of the comments are given below.

Unique program requirements and unique site influences shape the appropriate design response. This is not possible with model design schools.

The primary disadvantage of a model school approach is that it removes the flexibility to shape the project according to the specific needs of a local community. Individual identity is often a component that has more weight to a local community than one may expect. Our experience is that architectural quality does matter to people...even in rural areas where one may not expect that to be the case. Furthermore, program trends, teaching methods, building materials and the like are often in flux. In our view the potential for savings in design fees does not provide for a greater overall value for a school division.

The idea of model schools is an exercise in pragmatics. The goal is to save money and time on the design of a school, but there is no guarantee that this will

occur. In fact, it probably will cost more. I hesitate to speak for "most communities," but a school is a cultural center and an incubator for our children's ideas. My community and my neighbors would like to influence how that incubator functions and looks.

Who decides what is best for the community?....With model school designs, the only designers of schools will be the large communities with funding to pay for a new design.

Additional comments on both advantages and disadvantages of the use of model school design plans are contained in Appendix C.

The major thrust of the study was to determine if it is feasible for the Department of Education to provide model school design plans for elementary, middle, and high schools. The question of feasibility can take on two meanings. The most obvious definition is to read feasibility to mean that it is possible for the DOE to provide such plans. One respondent indicated that technically it is feasible, yet answered "no" to that particular question. This seems to be the definition most superintendents and facility planners cited in replying to the survey instrument. The other meaning is to define feasibility as a matter of judgment, that is, should the commonwealth provide such plans. In order to explore both meanings, a question dealing with the appropriateness of the DOE doing this was developed. Questions applicable to both meanings were included in the survey instrument for all four groups of respondents. Results of these and other related questions are included in Table 3. Again, the items have been shortened to fit the table format. Complete wording of each survey item is contained in the appendix.

Table 3
Responses to Questions Related to Feasibility of Model School Design Plans

	Yes %	Maybe %	No %
Is Model School Design a feasible idea?			
Superintendent	59	0	41
Facility Planner	73	0	27
Architect	33	0	67
Engineer	23	0	78
Should commonwealth provide Model School Plans?			
Superintendent	47	24	29
Facility Planner	65	14	21
Architect	12	0	89
Engineer	12	0	89
Do you believe Model Schools would be faster to build?			
Superintendent	24	29	47
Facility Planner	33	27	40
Architect	0	12	88
Engineer	12	12	78

Could speed of delivery of Model Schools make a difference in use?			
Superintendent	35	24	41
Facility Planner	40	40	20
Architect	22	88	0
Engineer	23	33	45
Would having designs of schools in Virginia on a Web site be helpful?			
Superintendent	100	0	0
Facility Planner	100	0	0
Architect	33	45	22
Engineer	56	23	23

The majority of superintendents and planners believe it is feasible for the Department of Education to provide model school design plans. The superintendents almost split on the question, 59 percent supporting the idea and 41 percent responding negatively to the question. The educational facility planners were more enthusiastic about the idea with 73 percent saying it is feasible. The majority of planners also believe that the commonwealth should provide such plans. The architects and engineers, however, did not agree with the educators on these two questions. One-third of the architects think it is feasible, whereas, 67 percent believe it is not feasible; 78 percent of the engineers do not think it is feasible.

The corollary question to the feasibility issue was the one that asked the respondents if the commonwealth should provide model school design plans. Only 47 percent of the division superintendents responded positively to this question; 29 percent responded negatively. Twenty-four percent of the division superintendents were unsure and replied "maybe." Almost two-thirds of the educational facility planners replied "yes" to this question. Again, the architects and engineers disagreed with the educators on this matter. Both architects and engineers replied negatively to this question with 89 percent of both groups replying "no" to the question.

Two supporting questions were asked dealing with whether or not schools built from model design plans would be faster to build. The first question asked the respondents if they believed a model school would be faster to build. Speed of construction might be a factor in favor of the school division using model school design plans. Only a small percentage of the superintendents and planners (24 percent and 33 percent, respectively) believed they could be. None of the architects responded "yes" to this question. On the other hand, 88 percent of the architects and 78 percent of the engineers said such schools could not be constructed faster. Twelve percent of the engineers agreed with the question and an additional 12 percent were uncertain. Forty-seven percent of the superintendents and 40 percent of the planners also replied "no" to this question.

The second question regarding the speed of construction of model schools asked if rapidity could make a difference in using model school design plans. Speed of delivery of the school building does not appear to be a determining question. The responses of the superintendents and planners were spread over three categories with no discernable pattern. The responses of the architects were spread over two categories, with 22 percent replying that speed of delivery might make a difference and 88 percent replying there is a possibility that speed might make a difference. The engineers responded similarly to the superintendents with 45 percent disagreeing, 23 percent agreeing, and 33 percent uncertain. Speed of delivery does not seem to be a very strong issue with any of the respondents in the four groups.

The respondents were asked about the idea of placing architectural drawings of completed school buildings on a Web-site for view of anyone interested in school buildings. Several states provide this service to educators and the public in the hopes of permitting them to view various school building designs before planning their own school buildings without having to travel to the actual sites to view them. The question was, "If it were possible to display recent school construction projects on a Web-site, would you use this to obtain useful information for planning purposes?" Overwhelmingly, both the superintendents and educational facility planners said "yes." One hundred percent of the respondents in both groups replied in the affirmative. Architects have a different feel for this proposition. Their responses were split among the three response categories. It seems they have some reservation about this method of educating educators and lay people regarding recent school designs. A little over half of the engineers believe it would be useful to have such plans displayed on a Web site.

One special concern in using model school design plans is the amount of community participation in the planning process. On the surface it would seem that if a school division is planning to use an architectural design plan that is already completed, there would be little opportunity or need for community input into what should be included in the new school. This concern was expressed by many respondents.

Division superintendents and educational facility planners were asked first of all about the level of involvement in planning by community members. The results of this question permitted a good picture of the level of community involvement in the planning process operated in various school divisions. The majority of responses to the level of participation centered on two middle positions. These two positions are that there is some community input, but no direct involvement in the decision-making process and that decisions are made with equal consideration given to community input. These two levels of participation accounted for 82 percent of the responses of the superintendents and 94 percent of the responses of planners. Only one superintendent and planner

indicated the community had minimal involvement in the planning process. A small number of superintendents reported that community input is primary in the planning process. For the most part, community involvement in planning for new schools is important to the school division.

The next question asked the respondents in the four groups to state how they thought involvement would be if a school division used model school design plans. The data show that both the superintendents and planners responses to this question are about evenly divided among the three possible response categories. Only 47 percent of the superintendents and 40 percent of the educational facility planners said involvement would be impaired. In contrast, 95 percent of the architects and 89 percent of the engineers stated use of such plans would impair community involvement. Some of the superintendents (29 percent) and planners (40 percent) thought that community involvement might be limited or impaired.

The results of responses from this series of questions are shown in Table 4 below:

Table 4
Level of Community Involvement in Planning

	Superintendent %	Facility Planner %
Community input is minimal	6	6
Some input, but no direct involvement	41	47
Decisions made with equal consideration	41	47
Community input is primary factor	12	0

Would community involvement be limited in using Model School Design Plans?

	Yes %	Maybe %	No %
Superintendent	47	29	18
Facility Planner	40	40	20
Architect	95	5	0
Engineer	89	0	12

In recent years, some school divisions have used prototype design plans to construct a number of buildings. The thinking behind the use of such plans is that the educational program of a school division is homogeneous enough so that the same type of building can be used in a number of communities and neighborhoods without serious modification of the architectural plans. When a school division is constructing a new elementary school every year, it makes sense to repeat the same architectural building plan throughout the school division because the educational program does not change that rapidly. A certain degree of uniformity of school facilities is obtained and apparently

some savings are achieved, especially in the maintenance of the buildings. To determine the degree of use of such plans, questions were asked regarding their use and how successful they were. In addition, the school divisions were asked if they borrow plans from other divisions. The results of the responses to these questions are contained in Table 5. Some of the responses do not equal 100 percent because of non-responses by individuals.

Table 5
School Division Use of Prototype Building Plans

	Yes %	Sometimes %	No %
Does your School Division use prototype plans?			
Superintendent	24	23	53
Facility Planner	13	47	40
Have you found them to be successful?			
Superintendent	42	0	58
Facility Planner	47	0	20
Have you used plans from other divisions?			
Superintendent	12	0	88
Facility Planner	60	0	40

The majority of the superintendents reported they do not use prototype plans for school buildings. This could reflect the fact that large-sized school divisions would be more likely to use such plans than would an average or small school division in the commonwealth. The facility planners reflect the responses of the superintendents to some degree. As for the success of prototype building plans, the superintendents are almost split on their replies, although 58 percent replied the plans were not successful. At least 47 percent of the planners indicate their use was successful in their school division. Almost a quarter of the educational facility planners surveyed did not respond to that item because their school division did not use prototype building plans. The responses of the educational facility planners do not mirror those of the superintendents because the planner's sample did not necessarily come from the same school divisions as the superintendents. There was, however, an overlap of four school divisions between the two groups.

Regarding the use of architectural school plans from other school divisions, the large majority of the superintendents (88 percent) replied they did not. The responses of the educational facility planners, however, were different. Sixty percent stated their school divisions did use them, but 40 percent replied they did not borrow plans.

The architect/engineers were asked about their level of involvement in developing prototype plans for school divisions. This question was used to gain a better understanding of the use of prototype buildings on a school division level. A large majority of architects (83 percent) stated they have been involved in such projects, whereas 17 percent reported not being involved. When asked if the projects were successful, 50 percent replied they were. Only a small number of respondents (11 percent) reported the project in which they were involved was not successful, and 22 percent thought the project might have been successful. The responses to this question do not equal 100 percent because of non-response by those individuals who have not been involved in a prototype project. In addition, the architects were asked how much modification of plans was necessary to use the same plans for a different neighborhood school. As much as 45 percent of the respondents replied they needed to modify more than 20 percent of the drawing plans to make them work in the new location. About a third of the architects reported they had to modify 10-20 percent of the plans for subsequent use.

A large percentage of the engineers (89 percent) responded that they had not been involved in prototype school buildings. One respondent had participated in a prototype building, but said it was a commercial structure. That respondent also indicated the project was successful, but the remainder of the respondents did not reply. Engineers were asked to estimate the percentage of modifications needed on model school design plans, even though they had no experience with them. Sixty-seven percent of the respondents indicated that modifications needed would exceed 20 percent.

Architect

Have you been involved in developing prototype plans for school divisions?

Yes – 83%	Maybe – 0%	No – 17%

How successful have these plans been?

Not very – 11%	Somewhat – 22%	Very – 50%

How much modification was necessary to use plans on successive projects?

Less 10% - 11%	10 to 20% - 33%	20% or more 45%

Engineers

Have you been involved in developing prototype plans for school divisions?

Yes – 12%	Maybe – 0%	No – 89%

Have successful have these plans been?

Not very – 0%	Somewhat – 0%	Very – 12%

How much modification was necessary to use plans on successive projects?

Less 10% - 12%	10 to 20% - 23%	20% or more 67%

Architects were also asked to respond to several questions pertaining to their involvement in preparing architectural plans for school buildings. They were first asked how much of their business was devoted to designing school capital projects. The responses are given below:

25% – 23%	25 to 50% – 28%	50 to 75% – 11%	75% or more – 28%

As can be seen from the data, 51 percent of the respondents devote 50 percent or less of their time to designing school buildings, while 39 percent devote more than 50 percent of their time to school business.

Architects/engineers were asked if they thought that some savings could be realized in developing and using model school design plans. The responses are give below:

Architects

Yes – 28%	Maybe – 45%	No – 28%

Engineers

Yes – 23%	Maybe – 23%	No – 56%

Most of the architect respondents (45 percent) thought there may be possible savings, but apparently were not sure. The majority of the engineers on the other hand indicated they thought there would be no savings. As a clarification question to the above, architects were asked to estimate what might limit potential savings in using model school design plans. These data are shown below. Again, responses do not equal 100 percent because of the non-response factor.

Architects

	Very Little %	Somewhat %	Very Much %
Site adjustments	0	5	95
Building modifications	17	33	45
Other factors	0	22	88
Building codes			
Education program changes			

Engineers

	Very Little %	Somewhat %	Very Much %
Site adjustments	12	0	89
Building modifications	12	45	45
Other factors	0	0	23
Building codes			
Education program changes			

Examination of the data indicates that in every instance of use significant changes to the model school design plans would be necessary because of different sites and local educational program changes or differences. These data are contrasted to the response to question #1 regarding potential savings in using model school design plans.

The resolution requesting this study implied that a substantial cost of school construction is the procurement of a suitable building design for the construction of an affordable and efficient building. Most architects charge client school divisions a negotiated fee that is usually a percentage of the construction cost of the building. The negotiated fee covers all services of the architect/engineer firm. These services cover the major phases of work such as the initial planning and designing the school building, development of the schematics, preparing final drawings, preparing contract documents, supervising bidding, monitoring the construction phase, and closing the project. In addition, architects must meet with various groups within and outside the school division to gather data needed to design the building. For all of these responsibilities, the architect/engineer firm must negotiate a fee with the owner, which usually amounts to a percentage of the construction costs. In most cases, the fees do not exceed 6 percent for new construction, slightly higher for renovation. This represents a very small amount of the entire cost of a capital construction project, whether it is a new building, an addition to an existing building, or renovation work. As one can see, preparing architectural plans does not represent the entire cost of architectural fees, but only a part of the total fees charged. Assuming the total cost of architectural and engineering services to be in the neighborhood of 6 percent, then one would assume that developing the architectural plan would be only a percentage of that amount, in other words, less than 6 percent.

To try to ascertain the total cost of using model school design plans, architects and engineers were asked to state how much of a fee they would have to charge a school division to provide needed architectural/engineering services should the school division decide to use a model school design plan. There was a range of responses from a low of 50 percent to a high of 100 percent of the total fee, which in most cases would be approximately 6 percent of the cost of construction. One engineer indicated service on a model school design plan would be equal to new design, which would be in the neighborhood of 6 percent. The response that included the last figure noted that because of the responsibility the architect/engineer would have to assume for the model

school design plans, a full fee would have to be changed. Several responses indicated it would be necessary to charge between 85 and 100 percent of a full fee, again with the same logic of architectural/engineer responsibility. The average of the responses that provided a set figure was 4.2 percent of the cost of construction as the fee to provide the remainder of services needed in the project beyond the preparation of contract documents.

The last question that was asked the architects/engineers related to their concern for liability in using the model school design plans. One hundred percent of the architects indicated they would be very concerned about this responsibility. A small percent (34) of the engineers indicated they had no concern for liability. Almost without exception, individual respondents who indicated they had concern gave a narrative to support their answer. Typical of the response was the following.

> *Before sealing documents, designers are required to ensure that they protect the health, safety, and welfare of the users and passersby. They are required to seal any work they do. Therefore, they are liable for the entire design even though someone else may have performed the original work. Modifications frequently include changes to the HVAC system to accommodate advanced technology and standards; changes to egress requirements to respond to new building codes; changes to materials, structural systems, and connections to respond to various climatic or soil conditions; changes to the orientation to accommodate the advantages and disadvantages of a particular site; and changes sought by the client to respond to new educational techniques of instruction. All of these changes and more would be expected and required of an architect by a client.*

> *If a model school includes detailed structural, mechanical, electrical, food service and architectural drawings, someone has to take responsibility for the design. Would it be the state? Likely not. Therefore, the contract documents must be sealed by architects and engineers, which makes us liable for the entire work. Keep in mind that building codes, other regulations and site parameters (wind loading, climate, soil conditions) are influx. Each design must be fully reviewed for current compliance.*

Considerable concern was expressed about the liability an architect would have to assume when using model school design plans. As stated above, an architect who places a seal on a set of architectural plans is assuring that these plans meet all standards of materials usage, building code compliance, and industry wide standards for quality of work. In fact, an architect must review all decisions, including calculations, that were made in developing the model school design plan. This process would take considerable time in order to have plans that could be legally sealed by an architect.

Common Design Features of Schools

A review of the architectural plans and capacity worksheets of all school buildings submitted to the Department of Education for the past two years was completed as part of the study of model school design plans. The purpose of this review was to determine if school buildings constructed in the commonwealth had common features that might be the basis for developing model school design plans. As can be expected, there are common features in every building used for educational purposes. This is partly because of the requirements of the educational program set by the commonwealth. An example of this might be the requirement for instruction in physical education on the elementary level. To meet this requirement, elementary school buildings should have some type of indoor play space. The exact dimensions might vary from school division to school division, but a play space of some sort nevertheless is required. A review of all existing elementary school buildings, however, would reveal that not every school has such an indoor play space, yet the requirement is still there. Department of Education requirements such as the maximum pupil/teacher ratio in each class would determine the minimum number of classroom spaces in a building, but the classroom is the basic area of instruction and no school is devoid of such spaces.

Variations in building components result from additional programs above and beyond commonwealth requirements that might be offered by the school division. These additional programs would require a space for student instruction. Educational programs, such as agricultural education would be a good example. Many of the existing high schools have an agricultural shop, but this is not a common space in urban or suburban high schools.

Elementary schools usually are designed so that classrooms are located on both sides of the hallway. The design can be a finger plan design where rows of classrooms extend from the common core facilities such as cafeteria, library, office, and gymnasium. Double loaded corridors can also be in the form of a square with an open space in the middle of the classrooms. A common design has the classrooms and core facilities in the shape of an "H" with the core facilities in the middle of the "H" and the classrooms forming the arms of the letter. Some elementary school designs have the classrooms located in a pod consisting of four to eight classrooms. A hallway connects the pod to the central core facilities. Some special instructional areas also might be included in the pod.

The most common design for middle schools uses the double loaded corridor to locate the classrooms. The design can be in the form of an "H," a "U," or an "I." Some middle schools use the pod as the major configuration of the classroom units with some support facilities in the pod.

Designs of high schools follow rather closely the forms used in middle schools. Because of the number of spaces requiring large areas such as gymnasiums, auditoriums, vocational shop areas, and libraries, the high school design usually takes on the form of a central massed area with classroom units located in arms that extend from the central core area. Most high schools are two-story structures with classrooms stacked to reduce long hallways and circulation areas.

The similarity of the footprint of buildings on all three levels of education is rather striking. The various building components are normally located in relationship to another component because of the educational program offered and the traffic pattern of students going from one area to another within a building. For instance, the most common requirement for placement of general classrooms in all three levels is that the classrooms be near the library because of frequent student use of the library. Other requirements contained in the educational specifications for each building dictate the final location of other components of the building. The gymnasium should have easy access to the outside and yet be easily accessible by the public from the main entrance of the school. The auditorium should also be easily accessible from the main corridor. The same can be said for the cafeteria. The general office also should be at the front of the building at the main entrance. These program requirements will then help to determine the final shape of the building. Educational relationships between various activities are the final arbitrator of the design of the building.

Nevertheless, spaces or building components that are common to the majority of schools can be determined. A listing of such spaces for elementary, middle or intermediate, and high schools follows:

There were 23 elementary school buildings constructed during the two-year period from 1999-2001. Plans for all these projects were submitted to the Department of Education. For middle and intermediate schools, 14 separate projects were submitted and constructed during the same two-year period. Plans were submitted for the construction of only six high school buildings. All of the capacity worksheets for these projects were used to determine common building elements.

Table 6
Common Elementary School Building Components

Number of Schools = 23

Component	Number of Examples
Instructional Areas	
Pre-Kindergarten Classrooms	10
Kindergarten Classrooms	17
General Purpose Classrooms	23
Science Classroom	4
Music Room	21
Art Room	22
Library/Media	23
Special Education Resource Room	2
Special Education Self-Contained	22
Gymnasium	10
Multi-Purpose Room	13
Computer Room	23
Non-Instructional Areas	
General Office	23
Guidance Office	23
Principal Office	23
Vice-Principal Office	15
Cafeteria	23
Kitchen	23

A review of the above data indicates there are some common elements in every elementary school building. One would expect general purpose classrooms, offices, cafeteria, and libraries to be included in the common building components, but the number of art and music rooms contained in the elementary buildings indicates that they also are part of the common components. Surprisingly, not every elementary school building indicated the presence of kindergarten rooms; however, this could be the result of nomenclature rather than the absence of the classroom space for this program. Those buildings that did not specifically list having kindergarten rooms did in fact identify certain general-purpose classrooms as kindergarten rooms. Although only 10 of the buildings contain identified rooms for pre-kindergarten programs, this number is an increase from previous years. The pre-kindergarten program is becoming a very important part of primary education. Specific classrooms for pre-kindergarten students should be listed as one of the common components.

Table 7
Common Middle School Building Components

Number of Schools = 14

Component	Number of Examples
Instructional Areas	
General Purpose Classrooms	14
Library/Media	14
Special Education Resource Room	14
Special Education Self-Contained	9
Gymnasium	14
Auditorium	4
Multi-Purpose Room	8
Computer Room	13
Exploratory Career Lab	14
Large Lecture Room	6
In-School Suspension Classroom	3
Non-Instructional Areas	
General Office	14
Guidance Office	14
Principal Office	14
Vice-Principal Office	14
Cafeteria	14
Kitchen	14
Teacher Work Room	14

The common building components for the middle/intermediate schools are similar to those for the elementary schools, but one exception is the exploratory career laboratories. Exploratory career subjects in the middle school can include woodworking, technology, agricultural education, world of work, computers, foreign language, or family life. The range of exploratory subjects is not limited and a school can emphasize special subjects. In addition to the exploratory career laboratories, common building components for middle schools include general-purpose laboratories, science classrooms, libraries, gyms, special education resource rooms, and computer rooms.

Table 8
Common High School Building Components

Number of Schools = 6

Component	Number of Examples
Instructional Areas	
General Purpose Classrooms	6
Library/Media	6
Special Education Self-Contained	4
Special Resource Classroom	6
Science Labs	6
Music Rooms	6
Service/Marketing Classrooms/Labs	6
Vocational Education Labs	5
Health Classrooms	4
Gymnasium	6
Auxiliary Gymnasium	4
Weight/Wrestling Room	6
Auditorium	1
Large Group Instruction Room	1
In-School Suspension	3
Non-Instructional Areas	
General Office	6
Guidance Office	6
Principal Office	6
Vice-Principal Office	6
Conference Room	6
Cafeteria	6
Kitchen	6
Teacher Work Room	6

Noninstructional common building components would include: general office, principal's office, assistant principal's office, cafeteria, and kitchen.

High school buildings have a large number of common building components, which is due to the extensive nature of the high school program. In order to obtain a standard high school diploma, students are required to take specific courses, and as a result areas of instruction for the courses are needed. There is, however, some leeway for the student to take various courses to meet these graduation requirements. Thus, specialized laboratories are provided, such as in drama, speech, art, journalism, and music.

There are three common areas in a high school that contain specialized laboratories where there is some variation in the specific type of laboratory that is built. These areas are: business/office education, service/marketing laborators, and vocational education laboratories. Within each of these broad areas, there are a variety of types of labs and classrooms. For instance, the business/office complex may contain spaces devoted to keyboarding/typing, computer applications, and business procedures, each with specialized equipment. Not all types of laboratories are found in every high school. The service/marketing area might contain spaces devoted to consumer/health occupations, teen living, and marketing. Each of these subjects requires an area with specialized equipment. The vocational education labs might be equipped for a variety of occupations. Examples of the types of laboratories in this area range from medical assistant, dental assistant, optical, photography, pre-engineering, computer assisted design/drafting (CADD), communications, nursing, electronics, horticulture, fashions and interior design, auto mechanics, to auto body. Not every high school has all of these laboratories, yet one school just recently constructed contains all of these laboratories.

With the exception of the auditorium, large-group instruction rooms, and specific in-school suspension areas, all of the above areas in a high school could be classified as common building components. The specific application of laboratories, however, will vary considerably from school to school depending upon the type of educational program offered.

Analysis of School Building Costs

The Virginia Department of Education maintains complete records of the cost of construction for all school building plans submitted to them. Statistics regarding these costs have been maintained for many decades and have been helpful to educators and design professionals in planning and designing buildings. Trends in costs have been recorded and provided to each school division on an annual basis. This is indeed a valuable service to those individuals and groups interested in providing safe and modern school buildings for students and teachers at a reasonable cost to the community. Educators and architects regularly use data provided by the Department of Education in planning and budgeting for new school projects. The analysis of data presented in this section of the report uses data from the DOE. A copy of the cost analysis is contained in Appendix D.

Several standard measures are used in describing the cost of a building. These measures can be used to project the cost of a proposed structure and in this manner help a school division and architect determine a budget for the project. The cost of various buildings also can be compared to determine the financial impact upon the school division.

The first measure used is the cost per square foot of building space. The square foot cost of the building is perhaps the best measure that can be used to compare the cost of capital projects. The square foot cost of a building is a rather precise measure because it includes only those costs involved in the structure. This statistic can be compared universally across the country. In some instances, professional publications report the square foot cost of project, which might include the cost of the site and development, as well as other costs such as fees. As a result, the total square foot cost of a project is not as precise. This statistic cannot be used successfully to compare costs between areas or regions because of what is or is not included in the statistic. Nevertheless, the total square foot cost of a project is used across the country regardless of the definition. In this study, the total project square-foot cost is accurate because the Department of Education is consistent in what is included in such costs for the school divisions in the commonwealth.

The other measure used to determine cost of a building or project is the per pupil cost. This statistic is developed by dividing the student capacity of the building into the total cost of the structure, plus the site and development. This is a very useful statistic that can be used to estimate costs and to compare projects; however, several factors can influence this statistic unduly. The smaller the school in terms of size of student population, the larger the per-pupil costs. This is true because the central core support facilities of the building require a certain amount of space regardless of the size of the student population. An example of this is the gymnasium. On both the middle and high

school levels, gymnasiums are provided and these facilities require a specified amount of space regardless of the total school population. Although the per pupil cost is a very useful statistic, caution should be shown in using it to compare costs in various regions of the state because of the differences in size of the schools.

Another factor that increases per pupil costs is the space required for special programs. Over the last two decades there have been a number of mandated new programs implemented in schools to address the needs of special populations. The space needed for these programs usually is in addition to the space required for regular education programs. As a result, the total square footage of every building has increased to accommodate these programs and the square foot per pupil has thus increased. In school divisions with a large percentage of disadvantaged students needing special programs, more spaces are needed in the buildings to accommodate these programs.

The square-foot cost and the per-pupil cost of a building are two statistics that are useful tools for educators and design professionals in planning for new and renovated schools. Of course, the statistics are influenced by inflationary trends. Both the cost per square foot and the per-pupil cost of a building increase every year when inflation is present. The costs of school buildings have been rising every year, reflecting the inflationary movement of material and labor costs. The actual inflation index of public school buildings, however, is usually below that for the private sector. There are several reasons for this. One reason is the close monitoring by school division personnel of the planning, designing, and bidding phases of the development of building plans. With close monitoring of the building plan development, the project usually does not expand beyond the original need of the school division in these stages. Another reason might be that a school division is a very stable and credit-worthy client, and because of this, bidders know they will be paid in a timely fashion. As a result, extraordinarily high contingency fees do not need to be introduced into the final bid for a school project. In any event, school divisions do not experience the high inflationary trends as much as the private sector does.

Analysis of the data available from the Virginia Department of Education indicates a steady increase in costs to construct a school building, whether measured by the square-foot cost or the cost per pupil. This is in keeping with the usual progression of building costs associated with the building industry throughout the country. The costs of schools are well within the normal range of building price increases. Table 9 on the following page shows data about the number of school projects submitted to the DOE for the past five years. In addition, the high and low range of costs on a per pupil, total project, and square-foot basis are shown.

The table shows that the costs associated with elementary schools have progressed steadily during the past five years. This increase has been in the neighborhood of 10-12 percent. This is reflected in the per-pupil costs and also in the total project and building costs.

Table 9

Analysis of the Range of School Building Costs in Dollars
1996-2001

Year	No. Schools Built	Per Pupil		Total Project/Sq. ft.		Building Cost/Sq. ft.	
		High	Low	High	Low	High	Low
Elementary Schools							
1996-97	15	12,332	8,131	107.16	86.08	93.98	74.08
1997-98	13	12,549	8,361	117.20	86.71	91.05	71.58
1998-99	20	13,226	7,844	116.29	82.72	99.51	72.67
1999-00	14	17,297	8,863	146.68	85.44	127.91	74.89
2000-01	11	13,894	9,770	122.27	95.32	106.48	83.54
Middle Schools							
1996-97	4	17,748	12,556	114.28	95.24	93.99	84.04
1997-98	3	14,624	12,726	104.70	100.04	88.37	85.32
1998-99	4	14,537	8,841	96.37	77.53	83.72	74.91
1999-00	7	17,491	10,041	121.14	89.07	105.51	75.41
2000-01	11	19,063	11,954	131.51	94.14	118.14	92.25
High Schools							
1996-97	3	19,894	15,360	122.80	95.15	96.95	78.74
1997-98	3	14,824	12,093	119.45	86.97	100.96	78.12
1998-99	4	22,064	15,440	119.70	112.60	101.12	98.41
1999-00	3	17,185	16,451	123.03	107.99	110.45	95.16
2000-01	3	20,479	18,226	133.06	109.46	115.83	94.61

The same cannot be said for costs associated with the construction of middle and high school buildings. The middle school costs vary considerably. The low costs for the total project for middle schools actually dropped from $95.24 per square foot in 1996-97 to $94.14 per square-foot in 2000-01. The high costs in the same category actually increased 15 percent over the years. Again, the low per-pupil costs declined from $12,556 in 1996-97 to $11,954 in 2000-01. The high building costs increased by 25.6 percent in five years.

The pattern of costs for high schools is similar and shows no definite trend. For per pupil expenditures, the high range increased only 2.9 percent, whereas, the low range figures increased by 18.6 percent. The high range of costs for the total project increased by 8 percent, but the low range of costs increased by 15 percent, almost twice the high range of costs. Because of the small number of high schools, changes affecting the average cost of construction are more pronounced than they are for elementary schools.

For the data on the middle and high school projects, some trends exist, but the small number of projects causes considerable fluctuation in data. One school that might have been bid when prices of construction material were high might have an impact on the statistics for three or four schools. The only trend that can be observed constantly is that the costs of middle and high schools have increased over the years to reflect changes in the entire building industry.

Table 10 contains data concerning the average size of building projects and the average cost of all projects submitted each year for elementary, middle, and high schools.

Table 10
Average Size and Costs of School Buildings

Year	Average Building	Square Feet /Pupil	Per Pupil Cost	Total Project Cost/Sq. ft.	Building Cost/Sq. ft.
Elementary					
1996-97	78,237	98	9,562	97.45	82.68
1997-98	79,949	131	13,356	102.17	87.03
1998-99	81,382	105	10,745	102.66	87.98
1999-00	81,625	102	10,916	107.51	92.99
2000-01	77,402	108	11,947	110.96	94.26
Middle					
1996-97	138,923	137	14,130	102.90	88.93
1997-98	125,667	131	13,356	102.17	87.03
1998-99	164,090	137	11,795	86.02	74.25
1999-00	152,366	136	14,294	104.95	95.52
2000-01	156,144	143	15,696	111.40	99.46
High					
1996-97	181,962	159	17,059	106.97	91.02
1997-98	298,012	135	13,304	98.81	89.41
1998-99	191,653	147	16,891	114.66	99.45
1999-00	150,723	141	16,665	118.12	104.70
2000-01	241,680	155	19,180	124.77	107.60

The average student square-foot allocation in the elementary schools has changed only about 10 percent over the past five years. The high per pupil allocation of 131 square feet in 1997-98 can be explained only by analysis of the individual schools submitted to the DOE. The square-foot allocation per student in the middle schools has increased slightly just as the overall size of the building has increased over the past five years. Some of the increase has resulted from increased demands of the educational program; there are also some anomalies in these data. For example, in 1998-99 the average middle school building had 164,090 square feet of space and yet the data for 2000-2001 show that the average size of schools was 156,144 square feet. This can be explained only by observing the individual school projects submitted to the DOE. The same can be said for the high schools. In 1997-98, the average size of the high school projects was 298,012 square feet of space, but in 2000-2001 the average size was 241,680 square feet. The average sizes of the buildings are the result of the projects submitted rather than any general increase in the size of the buildings. Again, a number of large-sized high school projects could have been submitted that year and in following years smaller projects could have been submitted.

The average per-pupil allocation of space has changed more on the elementary school level than on either the middle or high school level. The increase has been on the order of 10.2 percent.

The per pupil costs of all three levels of school buildings has increased. The increase on the elementary level has been 25 percent, but only 11 percent on the middle school level and 12 percent on the high school level. Increases on the total project and building costs have occurred in almost the same fashion and to the same degree. Total project costs have increased by 13.8 percent on the elementary, 8 percent on the middle, and 16.6 percent on the high school level. Again, these increases are in line with the normal increases of the industry. The average building costs on the elementary, middle, and high school levels have increased respectably on the order of 14, 11.8, and 18 percent, respectively. These increases are in keeping those experienced found throughout the building industry for the past five years.

Just as the operating cost of education varies from location to location throughout the commonwealth, the cost of construction varies. Table 11 displays a comparison of average costs of school buildings by rural and urban regions.

Table 11
Comparison of Average Costs for Rural and Urban Schools
1999-2001

Region	Square Foot Per Pupil	Square Foot Cost-Building	Per Pupil Costs
1999-2000			
Elementary			
Rural	100	$ 98.94	$ 9,690
Urban	101	$ 154.44	$ 11,673
Difference	1%	56%	20%
Middle			
Rural	156	$ 100.49	$ 15,668
Urban	129	$ 106.82	$ 13,979
Difference	21%	6.2%	12%
High			
Rural	149	$ 112.64	$ 16,818
Urban	135	$ 123.03	$ 16,599
Difference	10.3%	9.2%	1.3%
2000-01			
Elementary			
Rural	115	$ 107.17	$ 12,241
Urban	106	$ 113.39	$ 12,398
Difference	8%	5.8%	1%
Middle			
Rural	153	$ 99.87	$ 15,342
Urban	138	$ 118.32	$ 16,312
Difference	11%	18.4%	6.3%
High			
Rural	—	—	—
Urban *	155	$ 124.77	$ 19,180

*All of the three high schools constructed during this year were from urban areas.

Normally, the same things should be said for the costs of school buildings. Geographic location does have a certain influence upon the total cost to construct a building. Location, however, is not necessarily the determining factor in the costs of school buildings. Educational decisions made on the local level, whether in rural or urban areas, have a great influence upon how much the total building project finally costs.

Analysis of the data indicated there is fairly consistent trend in cost differences between the two regions. In almost every case, the cost of school buildings has been greater in the urban areas than in rural areas. Sometimes the average square-foot cost is greater than 50 percent, as in the elementary schools in 1999-2000.

There are only two instances where the per-pupil costs of a school building were greater in rural areas than urban areas. These occurred on the middle and high school level in 1999-2000. Review of the square foot allocation per pupil indicates that with the exception of the elementary schools in 1999-2000, rural school divisions specified more square footage for students than did urban areas. This is because the schools in most cases are smaller than those schools in the urban areas.

There are many decisions local educators, school boards, and architects make that greatly influence total costs of school buildings. The first determinate would be the extent of the educational program offered by the school division. The commonwealth maintains certain standards in program offerings that every school division must meet, regardless of the location. This influences the initial size of the building and subsequent costs. An example of this are the science laboratories needed in high school buildings. Other examples might include gymnasiums, libraries, special education classrooms, and guidance space. A school division must provide for these programs in appropriate facilities in order to meet certain federal and state requirements. In addition, some school divisions augment the basic education program of the commonwealth with programs desired by the local community. Again, this practice influences the amount of space needed in school buildings.

The number of students to be housed in the building greatly influences the size of the building and subsequently the total cost of the facility. For instance, the smaller the student body, the greater the square-foot allocation per student. Conversely, the larger the student body, the smaller the per-pupil square-foot allocation needed. The reason for this is because there are certain support facilities that are required regardless of the number of students housed in the building. Support facilities such as gymnasiums, libraries, and cafeterias require a certain amount of space regardless of the size of the student body. This increases the per-pupil square-foot allocation within the building and eventually is reflected in the total cost of the building.

Two other factors play a large role in determining total cost of school buildings. These factors have to do with the time of year a capital project is bid and the number of competing building projects needing contractors. Obviously, there are certain periods during the year when it is most propitious to put the project out for bid. Architects know these times and try to prepare the project for bidding when it is favorable. Architects also are knowledgeable about the number of large projects that are on the market ready for bid that would be potential competition for the school project. They try to avoid these times, if possible. Over-riding these decisions, however, is the need for the school building to be completed. This takes precedent, many times, over the economic factors at the time of bidding.

All of these factors enter into the final cost of a school building to the school division. Needless to say, because of this there should be a sizable variation in school building costs throughout the commonwealth. Surprisingly, variations in costs are not that great and probably no more than what should be expected given the varied geography of Virginia.

Legal Issues of Procuring Model School Design Plans

The process of procurement is set forth in the Code of Virginia and is used daily by the Department of General Services to obtain professional services for the commonwealth. Description of the services to be secured and the product to be delivered are normally resolved before such services are commissioned. The procurement process for obtaining professional services to develop model school design plans is detailed and there are problems that need to be resolved. The procurement process is described and problems are identified in this section of the report.

Process of Procurement

The process for procurement of a set or sets of architectural plans for elementary, middle, and high school buildings would be similar to the process for procuring any kind of professional services. The procedures are mandated in the Code of Virginia and administered through the policies of the Department of General Services (William Scott, 2001).

Two considerations must be accommodated in procuring architectural plans. The first is the selection of the architectural firm or firms that will complete the drawings for the public school to be constructed. This is normally done by describing the qualifications of the architect/engineer and developing criteria for selection. This task could be completed by the joint effort of the Department of Education and the Department of General Services. A Request For Proposal (RFP) would then be advertised throughout the industry and the procurement process would be followed in selecting a vendor.

After the architectural firm or firms are under contract, the Department of Education would need to produce a document from which the architects would work to produce the model school designs. The staff would need to specify the kinds of school buildings needed. In essence, this document would of necessity have to provide a complete set of educational specifications for each of the schools. A set of educational specifications normally contains the following sections: description of the community in which the school will be located, the minimum and maximum number of students, statements regarding the type of educational program that will be carried on in the new building, space allocations for all activities of the program, the number of such spaces, the relationship between the various components of the school, needed equipment, description of the technology services and equipment needed, and the number and kinds of outdoor play and athletic fields. In the case of model schools, this description should be based upon a standard educational program for the commonwealth, which would not make allowance for local additions to the basic educational program.

Writing a complete set of educational specifications for one building is a challenge for a working staff of any school division, but in this particular situation, at least three and maybe as many as 16 separate documents would need to be written. Such a task would be far above the capabilities of any school division in the commonwealth and would be beyond the present staff of the Department of Education. The task of writing multiple sets of educational specifications is time consuming in contacting educational specialists and writing the expressed needs of a particular program. Compiling these descriptions also requires considerable time. Consideration should be given to contracting for this service.

In addition to the time commitment of writing educational specifications, the description of the educational program would be a great challenge because the commonwealth does not have a standard educational program beyond the minimum program required by the Standards of Quality and the Standards of Accreditation . Even though these standards contain a description of the basic program, all school divisions have additional program offerings. Writing a common educational program would be almost impossible without severe compromises.

Procuring sets of educational specifications would involve the same procedure as that of employing an architectural firm and would follow the procurement act. An exact description of the documents to be delivered would need to be developed by the DOE staff. The parameters of the document would need to be established before the Request For Proposal is issued.

The method of procurement for the two types of professional services described above is straightforward. The staff of the Department of General Services conducts such procurement services daily. There are, however, many problems that would be encountered in actually getting any kind of architectural drawings for school buildings. These problems should be resolved before any serious attempt is made to obtain model school design plans.

Problems

The problems discussed below are associated with the procurement of architectural services and the development of actual architectural drawings. These are the problems enumerated by various sources during the project. Some problems are more serious than others are, but all of the problems were in some fashion identified by respondents. No attempt has been made in this report to resolve the problems. The resolution of these problems can only be done if the commonwealth decides to approve model school design plans, but they should be addressed before actual implementation.

Being selected by the commonwealth to develop a set of model school design plans would be a great honor for any architectural firm. Architectural firms from many states would be interested in being given such a commission. This would be good because the pool of expertise would be enlarged and the commonwealth would benefit from better plans. An architect must be licensed to do work in Virginia and the commonwealth would need to be assured that the work completed by the firm would be done by a licensed individual.

Section 310.0 of the Virginia Construction & Professional Services Manual (January 31, 2001) states that ownership of all documents and materials including original drawings completed by an A/E firm will be with the owner, which in this case would be the commonwealth. Architectural plans and documents would no longer be the property of the architect, but of the state. Several architects in the survey mentioned this fact and further stated that few reputable architects would agree with this condition of employment. As a result, they said, only a limited number of architects would apply for such a commission.

Whether or not the use of model school design plans is voluntary or mandatory is very important. Most superintendents and educational facility planners believe that if the commonwealth decides to develop model school design plans, their use should be voluntary and not mandatory. If, however, their use were voluntary, few educators would probably take advantage of the plans as has been the case in the past history of model school design plans.

The joint resolution stipulated plans for elementary, middle, and high schools, but did not address the size question. The DOE has developed sets of Recommended Prototypical Space Programs for each of the three levels of education. See Appendix E for copies of the program. On the elementary and middle school levels five different sets of recommended space allocations were completed for schools of various sizes. Six sets of recommended space programs were developed for the high school level. This represents 16 sets of space recommendations. Any set of model school design plans would have to address this variation in schools by developing plans for each recommended size. The cost of developing sixteen different plans would increase the cost of the project considerably.

Perhaps the most difficult problem would be the development of the educational program upon which the model school design plans would be based. As mentioned earlier in the report, some definition of the type and kind of educational program would have to be made before any architectural plans could be developed. If the plans were based upon the basic education program for which the commonwealth assumes responsibility and for which school divisions are reimbursed, the resultant school building probably would not meet the needs of the majority of local school divisions.

There is a great variation in educational program offerings in the schools across the commonwealth and the DOE does not have a standard program for public schools. The educational program of the Fairfax County School Division is different from the program offered in Alleghany County. The comparisons between school divisions could go on and on because of the great differences between the regions of the commonwealth. It would be virtually impossible to meet the needs of the majority of school divisions. The whole idea of model school design plans for every school division founders on the inability to meet local school division education needs.

A corollary problem deals with the extent of development of model school design plans. Will the model school design plans be a complete set of bidding documents or just preliminary designs of a building? If the plans are simply to be schematic drawings of school buildings, developing such plans would be a duplicative effort because such drawings are now available on several Web-site , through the National Clearinghouse for Educational Facilities, and through several professional organizations.

If, however, the model school design plans are to be a complete set of architectural drawings and technical specifications, other problems are raised. A set of contract documents of bid documents consists of complete architectural drawings and a set of technical specifications describing in detail all of the materials to be used in the building. If this is the extent of the model school design plans, then obsolescence of the specifications will become a problem very shortly. Vendors of materials and furniture change their offerings or go out of business quickly enough to cause a problem in supplying all needed items.

In addition to the problem of a continuous supply of described material and equipment, building code changes at the state level would also require an on-going program of upgrading of the architectural requirements with added architectural and engineering fees.

Changes in the educational program offerings of public schools and in the teaching methodology occur continuously so that updating architectural plans would be required, and result in additional fees.

Summary & Conclusions

Senate Joint Resolution No. 400 requested input from various sources regarding the feasibility of the commonwealth providing model school design plans for school divisions. Some of the identified groups of individuals who are interested in school facilities included division superintendents, educational facility planners, architects, and engineers. These groups were surveyed to obtain their input. In addition, an analysis was to be made of construction costs for school building projects submitted to the Department of Education. Finally, a study of the school plans to determine common components of school buildings was to be completed. All of the above segments of the study were completed and the results are reported below.

Survey Findings

A survey instrument consisting of 15 items was developed to obtain input from division superintendents, architects, and other interested persons relative to the feasibility of the Department of Education developing model school design plans for elementary, middle, and high schools. The purpose of developing such plans was to reduce the cost of providing safe and modern school facilities.

The selection of the sample of division superintendents was made based upon the criteria of the school division having an on-going capital improvement program with a variety of new schools being constructed. In addition, superintendents from school divisions that did not have an on-going capital improvement program were selected for participation. The reasoning was based on the belief that the growing school divisions would be the ones that would use model school design plans on a continuing basis. School divisions without immediate need of new school buildings might benefit from such plans in the event they would build a replacement school. A total of 23 superintendents were selected for the sample.

The educational facility planners selected were individuals who work on a daily basis planning new or renovated buildings and were employed by school divisions. A sample of 20 planners was identified. Most of the educational facility planners came from school divisions where the superintendent was not included in the group of respondents. There was only minimal overlap between superintendent and planner from the same school division.

A sample of architectural firms was selected from a list compiled by the Department of Education. These firms were those that did the majority of design work for schools in the commonwealth. A sample of 20 architectural firms was selected to obtain input. The survey instruments were addressed to individual architects within the

firm. Four architects requested to participate in the survey and that raised the sample to 24 individuals. Responses from the original 24 architects in the sample were in the range of 70 percent. A total of 60 additional responses, however, were received from unsolicited participants. The responses of this latter group were analyzed separately and compared with the responses of the original sample. The result of the analysis indicated the responses were no different from the original group.

The Virginia Society of Professional Engineers and the Consulting Engineering Council of Virginia were asked to send the survey instrument to their membership for their input. A total of 10 responses were received from engineers.

Several survey items were common to all four groups of professionals. This was done to provide data for comparison purposes. In addition, specific questions were asked of the superintendents and planners that were not asked of the other two groups to obtain data relating to certain practices that were particular to them. The same can be said for the architects and engineers. Questions regarding fees and changes to designs that are directly related to their work are examples.

There are perceived advantages and disadvantages to the use of model school design plans by any state. In Virginia, superintendents and educational facility planners seemed to think such plans would save in overall costs of design. The architects and engineers do not think there would be savings. Perhaps the difference between the two groups is that educators are probably not very knowledgeable about the fee structure of design professionals nor the amount of work involved in modifying plans to fit local sites and needs. The majority of all four groups expressed their feelings that model school design plans would not fit the needs of the local community. Further, the architects and engineers think that schools built using such plans would not be more cost effective than other buildings and that the community would not feel they owned the school. Even though there may be a difference of intensity of feeling all four groups think there are some distinct disadvantages to using such plans.

Two very basic questions regarding the feasibility of producing model school design plans and the desirability of the commonwealth providing them are at the heart of the study. The superintendents and educational facility planners indicated such plans were feasible to produce and that it would be desirable for the commonwealth to produce them. Alternately, the architects and engineers adamantly opposed the idea. At the same time, the majority of respondents in all four groups believed the model school design plans would not fit local educational program needs. The respondents, in answer to this specific question, expressed this position very clearly. Narrative statements from all groups supported the responses. This may seem like a contradiction between what educators said about the feasibility of model school design plans and their utility on the local level, but they may be expressing a thought that model school design plans may be usable in some other school divisions.

Construction Cost Findings

The Department of Education maintains construction cost data of all school building projects completed. The data for all projects submitted for the last five years were analyzed to determine cost trends and possible geographical differences. The joint resolution asked for an analysis of costs associated with various designs for elementary, middle, and high schools. The designs for the school buildings analyzed revealed a great deal of similarities in general design and as a result no discernable differences in design could be made. Except for the size of the building, no cataloguing of buildings into specific groups could be made for comparing costs. In the past, there were specific design groupings into which a building could be placed. For instance, during the 1960s, round buildings were constructed in many localities. Likewise, compact, square buildings have been popular in the past, as was the campus style public schools. The school buildings of the past five to ten years have followed the more traditional approach of basic core facilities and double-loaded corridor classroom wings. This observation is true for all three levels of school buildings. As a result, no comparison could be made of building design and construction costs.

The comparisons that were made were historical and geographical. The historical analysis indicated an increase in size of buildings on all three levels because of program expansion. The increase in construction costs over the past five years reflects the inflation of costs in the building trades industry.

The geographical comparison was made using rural and urban areas. Analysis revealed that buildings in the urban areas cost more than in rural areas. This is opposite the common belief that construction costs more in rural areas. There were only two instances where the per pupil costs of middle and high schools were higher in the rural areas than in the urban areas.

These comparisons, however, must be observed with caution because educational decisions and program demands on the school division level have more to do with the final cost of buildings than does anything else. These decisions determine the amount of square-foot allocation of space per student and in some cases determine the total square-foot cost of the building. For instance, specialized laboratories increase the general square-foot cost of a building. Likewise, the number of students in a building can increase the total cost if there is a small student body. This is true because the need for minimum core support facilities is the same regardless of how small the student body is. This in turn increases the total amount of square-foot per student needed for the building. The economy of scale is not as evident as in large schools. In addition, the number of individual school buildings included in the analysis was limited, and in such cases individual school projects can greatly influence building costs for the group. For these reasons, comparison of school building costs is fraught with difficulties that can lead to incorrect impressions.

Common Building Components

An assessment of the completed school building projects submitted to the Department of Education for the past two years was done to determine common building components, which are classified as separate spaces within a structure. Thus, a gymnasium is a building component, as is a library or classrooms. The implied reason for examining building components would be to determine if commonalties exist within specified levels of buildings. The assessment involved obtaining data from forms developed by the staff of the DOE and aggregating the number and kinds of identified components that are used for instructional and noninstructional purposes. The data revealed several common components that all school buildings of that level have. Elementary school buildings had more common components than the high school buildings. The similarities not withstanding, there were differences between buildings based more on the geographic location than upon the educational program. The reverse was true of the high school buildings. There were fewer common components of the buildings on this level than on either of the other two levels. The reason is the difference in educational programs. One high school had 14 different vocational laboratories and shops. All of the other high school projects had fewer vocational laboratories.

Although the joint resolution did not explain why an analysis of common building components should be made, it might be surmised that through such an exercise the basic parts of a model school design could be determined. The analysis of building components did supply some elements of a building that should be included in every school that is constructed in the commonwealth. These building components, however, are very basic elements and each school building would have more components added to the building to accommodate the local educational program. The common components or elements of the buildings analyzed are given below:

ELEMENTARY	MIDDLE	HIGH
General Purpose Classrooms	General Purpose Classrooms	General Purpose Classrooms
Special Education Rooms	Special Education Rooms	Special Education Rooms
Library/Media Center	Library/Media Center	Library/Media Center
Gym/Play Area	Gymnasium	Gymnasium

Elementary	Middle	High
Music/Art	Exploratory Labs	Music
Computer Laboratory	Computer Laboratory	Computer Laboratory Art Vocational Labs
Office Complex	Office Complex	Office Complex
Cafeteria/Kitchen	Cafeteria/Kitchen	Cafeteria/Kitchen

The above components are the most common building elements listed in the tables in the body of the report.

Conclusions

Whether or not the commonwealth should provide model school design plans for elementary, middle, and high schools to the school divisions revolves around five basic issues. These issues can be a morass into which the commonwealth may not wish to venture.

1. The economy of multiple use of architectural plans for school buildings on the local level. The general thought behind the use of any kind of stock, standardized, or model school design plans is that there would possibly be savings in architectural and engineering fees. Such economies would be passed on to the school division. The idea of saving any capital funds through the multiple use of uniform plans is doubtful at best. Providing model school design plans would simply shift the cost of architectural fees from the school division to the state level. The commonwealth would need to fund the cost of any model school design plans. In theory, however, the more often the model school design plans were used, the more cost effective the plans would become. The use of these plans by a school division would determine whether or not it is a feasible idea. Survey results indicated few of the respondents thought the plans would fit local needs.

   The economy realized by use of model school design plans would be at the most a fraction of the total cost of a school building. In the first place, the only funds that could be saved through such a plan would be the fee an architectural/engineering firm would charge a client for such services. The responses of the design professionals indicated that a normal fee would be approximately 6 percent of the costs for new construction. This fee covers not only all of the work entailed in initiating and developing drawings, but also preparation of contract documents and securing approvals. These services can consume from one to three years of full-time work of a staff. Architects/engineers also provide services in addition to developing architectural drawings, which are included in the normal contractual relationship. They provide services such as assisting in the bidding process, monitoring the construction phase, and closing out a project. Each of these major services consists of numerous activities that extend over two or three years and intensely engage the architectural firm. The breakdown of architectural/engineering services typically looks like this:

Programming/Schematic Design	15% of total fee
Design Development	20% of total fee
Working Drawings (Contract Documents)	38% of total fee
Bidding/Negotiations	2% of total fee
Construction Administration	25% of total fee

These percentages represent a portion of the nominal 6 percent architectural and engineering fees charged school divisions for a new building project. According to one architect, every project must have construction administration and bidding services, which would account for approximately 27 percent of the total architectural fee. At the very least 30 percent of the remaining fee (30% X 73% = 21.9%) will be used to adapt the model school plans to the actual site and provide the site drawings and specifications. The very best scenario would indicate the school division might be able to negotiate a fee for the remainder of the work with an architect for approximately 3 percent of the construction cost. Having said this, we still have not yet considered the management costs the inevitable changes by the school division, and the cost of liability that the division architect must take into account.

Design professionals have estimated that the development of model school design plans would consume more than half of the normal fee, which might amount to 3 or 4 percent of estimated construction costs. If this cost is shifted to the commonwealth, savings could be generated for the school division, but the total cost of the architectural consultants would probably be increased. In fact, overall savings would not start to occur until the total number of model school plans used exceeded the number developed. If the number of applications were for 16 schools, as previously discussed, the chance of any overall savings would be minimal. Additionally, costs to update and maintain the model school design plans would further diminish the opportunity to realize any savings. Yet the architects and engineers stated through their responses that they would have to charge the local school division a fee of from 3 percent to 6 percent to modify the state model school design plans and complete the remainder of the work to complete the building project. The possibility of any kind of economy on such a project would be very slight.

In order for a model school design plan to work for a school division, the actual model design plans would have to be complete contract or bidding documents. This entails a complete set of architectural and engineering plans, plus a set of technical specifications describing every type and kind of building material that will be used. Such a set of documents could quickly become obsolete as a result of changing educational needs in school divisions, availability or lack of availability of responsible vendors to supply goods and materials over a period of time, and state building codes. Systematic changes and redesign would need to be made to the model school design plans to keep them up to date. This would result in additional fees that would add to the cost incurred by the commonwealth. The revision and updating process would become a constant demand for state funds.

2. The problem of the size of a school building would have to be resolved. School buildings in Virginia range in size from 100 students to more than 3,000 students. Changes in the size of a building is not a matter of simply adding more classrooms to a specified core building. When buildings increase in size, the core and support facilities must be increased proportionately. A high school designed for 1000 students cannot easily be expanded to house 2000-3000 students. Likewise, a school sized for 500 elementary students cannot be expanded to fit 900 students simply by adding classrooms. As a result, several sizes of plans on all three levels of schooling would need to be developed to implement a model school design plan. At the present time, the Department of Education has recommended square foot space allocations for sixteen different sized schools, five sizes on both the elementary and middle school levels and six on the high school level of schooling. See Appendix E for copies. Any kind of model school design plan would need to address such diversity of size of school building. This might result in a considerable investment by the commonwealth in design fees for multiple sets of plans. In addition, students do not come in convenient packages of 500, 1,000, or 1,500, or any other predetermined number. In some cases the standardized plans might necessitate a school division to over-build because of the limitation of the school plans that do not accurately reflect the student population.

3. Perhaps the most pressing problem for implementing a model school design plan would be how to address local educational needs through a uniform building scheme. The majority of respondents in all four groups indicated they felt this would be a problem. The design of a building to fit a school division in one section of the state might not fit the needs of a school division in another section of the state, and the cost of redesign would fall upon the local school division. The feeling expressed by respondents on this issue might mean that model school design plans would not be a feasible idea for the commonwealth to pursue.

   There are many reasons for not using model school design plans, but the most important one is that a school plan based upon a statewide model education program does not address the needs of a school division. The local educational program cannot be accommodated in a generic school building designed to fit all localities. Statewide plans normally are based upon minimum educational programs and most school divisions go beyond minimum state requirements. Accommodating local needs is extremely difficult in a model school plan. The result of using such plans would be a reduction of the educational program to fit the building. This is just the reverse of what educational facility planning is all about.

4. Community involvement in planning a new school building is quite important in the local school division. The educators who responded were split in their feelings about possible limited involvement of the community if model school plans were used. The architects and engineers were adamant about their feeling that community participation would be limited. Normally, community members are brought into the planning stage of a new capital project early in the process. If a pre-determined building is used, there seems to be a lack of opportunity to effectively involve the community in planning a new school building. Architects and engineers are usually on the front line of community, participation in building projects. They are the ones who must present ideas and plans to the community, and they may have a good feeling for the dynamics of community members being involved. Their responses seem to indicate such a feeling. Regardless of responses to the question of community participation, the reality of the situation is that significant involvement cannot be brought to fruition if a school-building plan is already completed. Trying to involve community members in such a situation would be on the order of convincing them that the state Department of Education already has a good design that they should accept.

5. Both architects and engineers expressed concern about legal liability if they were asked to be the architect of record for a model school design plan. To guard against possible liability and to comply with licensing procedures, all of the decisions and calculations made in a set of contract documents would need to be re-visited by the architect/engineer of record. This likely would be a costly operation for the architectural firm and would potentially increase the cost to a school division.

   Whether or not the commonwealth would have any liability in the use of model school design plans is doubtful because, according to the Attorney General's office, there has not been any litigation on this matter in Virginia. Further, the principle of sovereign immunity would undoubtedly protect the commonwealth in this as it does in other matters.

Senate Joint Resolution No. 400 requested a determination of the feasibility of the commonwealth providing model school design plans for elementary, middle, and high schools. Providing such plans to school divisions is indeed technically feasible. There would be no reason why the commonwealth could not provide such plans, but the real issue is whether or not such plans would be used or accepted by school divisions. The evidence points to the finding that such plans would not be used or accepted because they would not meet the needs of the local educational program. In addition, there are some major problems associated with the use of such plans that would more than likely

negate any possible savings that would be realized. In fact, the perceived savings with model school design plans are actually nothing more than shifting costs from the local school division to the commonwealth. Even at that, the transfer of economies would be in the architectural fee, which is a small percentage of the total cost of a building, but again, the preponderance of evidence would indicate there would not be any overall savings realized.

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Appendix A

School Divisions Surveyed

Chesapeake City*	Manasas Park City	Lynchburg City
Chesterfield County*	Lee County	Roanoke County*
Fairfax County*	Montgomery County*	Norfolk City*
Henrico County*	Albemarle County*	Washington County
Loudoun County*	Carroll County	Wythe County
Richmond City*	Fredericksburg City	Alleghany County
Virginia Beach City*	Rockbridge County	Frederick County*

*School divisions that have on-going capital improvement programs

Appendix B

MODEL SCHOOL DESIGN PLAN SURVEY

Please answer the following survey questions in light of this proposition:

The General Assembly has requested the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools.

Please share your ideas regarding model school design plans (Items 1 & 2):

1. In your view, which of the following are advantages of model school designs?
[*Please check all that apply*]
____Savings in the overall cost of a new school building
____Quicker completion of the building project
____Our community would probably appreciate a model school approach
____Our community would have confidence in the quality of a model school
____Other_____

2. In your view, which of the following are disadvantages of model school designs?
[*Please check all that apply*]
____Model school plans do not fit our educational program needs
____Schools built using model plans are no more cost effective than originally designed buildings
____Model plans would not help the community feel they have their own building
____The community would not accept a model school designed building that came from the Commonwealth
____The community would feel the model design schools are not of the same quality as our school buildings
____Other_____

3. If it could be demonstrated that buildings constructed from model design plans were less expensive to build than originally designed buildings, would your school division consider using them?
____Yes ____Maybe ____No

Do you think the Commonwealth should provide model school design plans?
____Yes ____Maybe ____No

5. Do you think model school design buildings would be any faster to build?
____Yes ____Maybe ____No

6. Would speed in delivery of the school building make a difference in using model school design plans?
____Yes ____Maybe ____No

7. Are there any circumstances under which your school division would consider using model school designed buildings?
____Yes ____Maybe ____No

If "yes," what are those circumstances? _____
_____

8. Please indicate approximately how involved the community is in determining school plans in your school division. [*Please check only one*]
____Community input is minimal
____There is some community input, but no direct involvement in the decision-making process
____ Decisions are made with equal consideration given to community input and planning staff input
____ Community input is the primary factor in our school planning process

9. Would community involvement be limited by model school design plans?
____Yes ____Maybe ____No

10. Does your school division make use of a locally developed prototype plan for repetitive building projects?
____Yes, always ____Sometimes ____No, never

11. Have you found using locally developed prototype design plans to be successful?
____Yes ____No ____I have not used prototype design plans

Has your school division ever used architectural plans from other school divisions as a starting point or as a prototype for new schools?
____Yes ____No

If "yes," did you find any benefit savings or efficiencies?
Please explain_____
_____

13. Do you think it is possible for VDOE to develop model plans that would meet the needs of your school division?
____Yes ____No

14. Do you think providing model school plans is a feasible idea?
_____Yes _____No

15. If it were possible to display recent school construction projects on a web site, would you use this to obtain useful information for planning purposes?
_____Yes _____No

16. Would you be willing to be interviewed on the telephone if further information is needed?

_____Yes _____No

If "yes," when is the best time of the day/week to contact you?

_____

MODEL SCHOOL DESIGN PLAN SURVEY-ARCHITECT

Please consider the following proposition in answering the questions below.

The General Assembly has requested the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools

Please share your ideas regarding model school design plans. (Items 1 & 2)

1. In your view, which of the following are advantages of model school designs?
[*Please check all that apply*]
____Savings in the overall cost of a new school building
____Quicker completion of the building project
____Most communities would appreciate a model school approach
____Most communities would have confidence in the quality of a model school
____Such an approach would save design time on future schools
____Other_____

_

2. In your view, which of the following are disadvantages of model school designs?
[*Please check all that apply*]
____Model school plans are incompatible with local educational program needs
____Schools built using model plans are no more cost effective than originally designed buildings

If "yes," what might those concerns be?

_____

Would community involvement be limited by using model school design plans?
____Yes ____Maybe ____No

12. Have you been involved in developing a prototype building design for a school division? ____Yes ____No

If "yes," how successful was that project?
____Not very ____Somewhat ____Very

13. On average, how much modification is typically needed for the prototype plans to be successfully used for other school building projects? [If you have not used prototype plans before, please estimate]

____ Less than 10%
____ Between 10% and 20%
____ More than 20%

14. Do you consider providing model school design plans a feasible idea?
____Yes ____No

15. If it were possible to put recent school construction projects on a website, would that provide useful information that your clients might use for planning purposes? ____Yes ____Maybe ____No

Appendix C

Selected Comments Regarding the Use of Model School Design Plans

Many respondents added comments to several of the questions asked on the survey instrument. Some of the more esoteric comments follow.

Advantages and Disadvantages of model school design plans.

Model schools aren't responsive to the site and often add lots of costs to site work and cause more environmental damage. They also run the risk of being assembly line buildings stooping to the lowest common denominator. Our children would be short-changed if this "McSchool" attempt to homogenize the built environment were enacted.

Model school designs would destroy creativity of our community and our children.

I believe that there are few advantages to the model designs because savings may or may not be realized, the building cannot be built any quicker, communities generally prefer a design suited to their needs and site, model schools have no inherent claim to quality, design time savings may be consumed with modifications required to respond to changing educational specifications and criteria, varying building codes. Site conditions, climate, and soil situations and should respond to improved techniques, and equipment.

Disadvantages of model school designs are lack of diversity and expression in design solutions, lack of flexibility to respond to local needs, loss of opportunities to innovate.

This [model school design plans] is a terrible idea – ultimately short-changing children of the appropriate learning environment – and depriving communities of input as well as the appropriate overall design response to both program and site influences. It is also loaded w/ potential liability.
Forcing a plan could actually cost more.

Do you consider providing model school design plans a feasible idea?

There is a big difference between utilizing prototype designs for a school system Vs across the Commonwealth.

Perhaps feasible technically, but not beneficial or useful.
For guidance to communities that have not built schools recently.

Do you think there are any savings in using a model school design?

The only savings in design time and fee are offset by the lack of a model school design to: 1. Speak to the regional and community issues, and 2. Would be outdated by the time it was re-used.

Would you be concerned about either individual or corporate liability in using model school design?

Yes, corporate infringements, secondary and third tier suits created by suits against architects using model school designs they did not design.

Authorship of the "designs" would have to be clearly defined as well as responsibilities of the state for the design documents.

Rampant opportunity for exposure. Professional liability insurance coverage could be affected. For survey – should check with professional liability insurance carriers.

Appendix D

Department of Education Facilities Cost Data

ATTACHMENT NO. 1 (Cost in $)

NEW ELEMENTARY SCHOOLS PUT UNDER CONTRACT IN FISCAL YEAR 200001

NAME/GRADES	DIVISION	CONTRACT AWARD DATE	SOL MAXIMUM OPERATING CAPACITY	TOTAL [1] CONST. COST	SITE DEVELOPMENT	TOTAL SQ. FT.	SQ. FT. /PUPIL	TOTAL COST /SQ. FT.	BUILDING ONLY COST /SQ. FT.	TOTAL COST /PUPIL
Appomattox	3-5 Appomattox	Apr-01	600	8,336,121	992,715	88,500	147	95.32	83.54	13,894
Ashland	K-5 Prince William	Mar.-01	839	10,159,000	2,014,345	83,084	99	122.27	98.03	12,108
Baker Butler	PK-5 Albemarle	Jun.-01	720	9,863,904	2,107,496	84,363	117	116.92	91.94	13,700
Forest Grove	K-5 Loudoun	Mar.-01	727	9,352,500	1,150,000	77,033	106	121.41	106.48	12,865
Hutchison Farm	K-5 Loudoun	Mar.-01	895	9,557,500	1,100,000	83,990	116	113.79	100.70	10,679
John Tyler	PK-5 Portsmouth	Oct.-00	500	6,335,186	668,500	58,272	117	108.72	97.25	12,670
Kempsville Meadows	PK-5 Virginia Beach	May-01	663	8,280,306	877,619	77,239	117	107.20	95.64	12,489
Middlesex	K-5 Middlesex	May-01	818	8,428,390	1,174,390	80,740	99	104.39	89.64	10,304
Rural Retreat	K-5 Wythe	Jun.-01	503	5,566,800	974,800	49,667	99	112.08	92.45	11,067
Stafford	K-5 Stafford	Jun.-01	935	10,039,700	1,876,847	87,700	94	114.48	93.08	10,738
Woodstock	K-5 Virginia Beach	May-01	876	8,558,082	1,287,933	80,840	92	105.86	89.93	9,770
TOTALS			8,076	$94,477,489	$14,224,645	$851,428				
STATEWIDE AVERAGE							108	$110.96	$94.26	$11,699

1

Usually includes construction, site development, water system, sewage disposal, built-in equipment and demolition. A & E fees, value engineering, construction management fees, cost of site, loose equipment, and furniture are excluded.

2

Division operating capacity may differ from the SOL maximum capacity.

Pre-kindergarten classrooms counted at 16 students, grades K-3 classrooms counted at 24:1, Grades 4-5 counted at 25:1.

3

Site cost, includes demolition of existing school building.

ATTACHMENT NO. 2 (Cost in $)

NEW MIDDLE AND INTERMEDIATE SCHOOLS PUT UNDER CONTRACT IN FISCAL YEAR 2000-01

NAME/GRADES	DIVISION	CONTRACT AWARD DATE	SOL MAXIMUM OPERATING CAPACITY	TOTAL [1] CONSTR. COST	SITE DEVELOPMENT	TOTAL SQ. FT.	SQ. FT. /PUPIL	TOTAL COST /SQ. FT.	BUILDING ONLY COST /SQ. FT	TOTAL COST /PUPIL
Belmont Ridge 6-8	Loudoun	Jun.-01	1,125	16,726,000	1,800,000	158,341	141	118.26	106.90	16,645
Benton Gayle 6-8	Stafford	Nov.-00	1,049	15,616,500	2,000,000	146,756	140	106.41	92.78	14,887
Blacksburg 6-8	Montgomery	Jan.-01	1,500	17,931,000	2,011,000	190,478	127	94.14	83.58	11,954
Braemar 6-8	Prince Wm.	Aug.-00	1,102	16,355,000	2,009,000	135,309	123	120.87	106.02	14,841
Christiansburg 6-8	Montgomery	Jan.-01	1,125	17,770,000	1,959,000	169,012	150	105.14	93.55	15,796
Harmony 8-9	Loudoun	Aug.-00	1,125	18,142,000	1,980,000	158,341	141	114.58	102.07	16,126
Southwest 6-8	Fairfax	Nov.-00	1,233	23,505,000	2,390,000	178,723	145	131.51	118.41	19,063
Wilson 6-8	Augusta	none	616	11,258,500	908,514	112,194	182	100.35	92.25	18,277
TOTALS			8,875	$139,304,000	$15,057,514	1,249,154				
STATEWIDE AVERAGE							141	$111.52	$99.46	$15,696

1

Usually includes construction, site development, water system, sewage disposal, built-in equipment and demolition. A & E fees, value engineering, construction management.

2

Division operating capacity may differ from the SOL maximum capacity.

State SOL capacity base on a pupil teacher ratio of 25:1in core classrooms.

3

Division operating capacity based on a PTR of 20:1 in Montgomery County Schools.

4

Water and sewer cost not yet determined

5

Contract not accepted - Project not built

ATTACHMENT NO. 3 (Cost in $)

NEW HIGH SCHOOLS PUT UNDER CONTRACT IN FISCAL YEAR 2000-01

NAME	DIVISION	CONTRACT AWARD DATE	SOL MAXIMUM OPERATING CAPACITY	TOTAL [1] CONST. COST	SITE DEVELOPMENT	TOTAL SQ. FT.	SQ. FT. /PUPIL	TOTAL COST /SQ. FT.	BUILDING ONLY COST /SQ. FT.	TOTAL COST /PUPIL
Heritage	9-12 Loudoun	Sept.-00	1,728	32,548,000	3,941,069	246,968	143	131.79	115.83	18,836
Matoaca	9-12 Chesterfield	Oct.-00	1,795	36,759,500	5,714,500	276,270	154	133.06	112.37	20,479
Seneca Ridge	9-12 Loudoun	May-01	1,728	35,150,000	6,073,390	245,703	142	143.06	118.34	20,341
South County	9-12 Roanoke	Oct.-00	1,212	22,090,068	2,996,068	201,808	167	109.46	94.61	18,226
TOTALS			6,463	$126,547,568	$18,725,027	970,749				
STATEWIDE AVERAGE							150	$130.36	$111.07	$19,580

1
Usually includes construction, site development, water system, sewage disposal, built-in equipment and demolition. A & E fees, value engineering, construction management fees, cost of site, loose equipment and furniture are excluded.

2
Division operating capacity may differ from the SOL maximum capacity.
State operating capacity is generally based on PTR of 25:1, in all program areas X 90%.

3
Site cost includes $396,000 for off-site utilities (water sewer).

4
Excessive cut and fill, and wetlands caused higher site cost.

5
Site cost includes special site development cost.

Attachment No. 4 (Cost in $)

SELECTED ADDITION AND RENOVATION PROJECTS UNDER CONTRACT IN FISCAL YEAR 2000-01

NAME	DIVISION	CONTRACT AWARD DATE	CONSTRUCTION COST	TOTAL SQ. FT.	TOTAL COST /SQ. FT.
Birdneck Elementary	Virginia Beach	Dec.-00	1,334,000	34,984	38.13
Blue Ridge Middle	Loudoun	Feb.-01	799,000	6,297	126.89
Carter Woodson Middle	Chesterfield	Mar.-01	6,827,615	55,000	124.14
F. T. Binns Middle	Culpeper	Jul.-00	13,281,200	135,455	98.05
George Washington High	Danville	Mar.-01	8,874,257	344,000	25.80
J. Lupton Simpson Middle	Loudoun	Feb.-01	690,000	5,838	118.19
Langston Focus	Danville	Mar.-01	5,200,000	107,000	48.60
Linkhorne Middle	Lynchburg	Mar.-01	9,958,000	146,187	68.12
Marshall Middle	Fauquier	Apr.-01	4,237,310	102,182	41.47
Prince Edward Middle	Prince Edward	Oct.-00	731,065	8,180	89.37
Salem Middle	Virginia Beach	Mar.-01	1,063,104	47,302	22.47
Sandston Elementary	Henrico	Jan.-01	1,198,000	6,560	182.62
Seneca Ridge Middle	Loudoun	Feb.-01	945,000	6,030	156.72
Sheffield Elementary	Lynchburg	Aug.-00	3,960,000	51,808	76.44
Sterling Middle	Loudoun	Mar.-01	1,010,000	9,089	111.12
Tappahannock High	Essex	Oct.-00	4,037,000	18,967	212.84
TOTALS			$64,145,551	1,084,879	
STATEWIDE AVERAGE					$59.13

1
Construction cost may include both new construction and renovated cost within the same project.

Attachment No. 5 (Cost in $)

TABULATION OF VIRGINIA AVERAGES FOR CONSTRUCTION COST OF SCHOOL BUILDINGS

FISCAL YEAR	95-96	96-97	97-98	98-99	99-00	00-01
ELEMENTARY:						
S. F./Pupil	97	98	104	105	102	108
Cost/S.F.	$86.33	$97.45	$93.82	$102.66	107.51	110.96
Cost/Pupil	$8,372	$9,562	$9,732	$10,745	$10,916	$11,947
Number of New Schools	15	15	13	20	14	11
INTERMEDIATE/MIDDLE:						
S. F./Pupil	131	137	131	137	136	141
Cost/S.F.	$86.03	$102.90	$102.17	$86.02	104.95	111.52
Cost/Pupil	$11,236	$14,130	$13,356	$11,795	$14,294	$15,696
Number of New Schools	5	4	3	4	7	8
HIGH SCHOOLS:						
S. F./Pupil	152	159	135	147	141	150
Cost/S.F.	$91.94	$106.97	$98.81	$114.66	$118.12	$130.36
Cost/Pupil	$13,945	$17,059	$13,304	$16,891	$16,665	$19,580
Number of New Schools	4	3	3	4	3	4
COMBINED AND VOC. TECHNICAL SCHOOLS:						
S. F./Pupil	128	146	0	379	141	0
Cost/S.F.	$82.53	$125.92	0	$108.98	$103.49	0
Cost/Pupil	$10,548	$18,347	0	$41,298	$14,554	0
Number of New Schools	1	1	NONE	1	1	None
ADDITIONS AND RENOVATIONS:						
Costs/S. F.	$45.12	$58.13	$51.19	$60.81	$83.74	$59.13
Number of Projects	9	16	20	20	8	16

[1]99-00 is for a combined Elementary/Middle.

[2]96-97 is Combined K-12 School.

[3]98-99 is a Special Education Center.

Attachment 6

Appendix E

Recommended Prototypical Space Programs

Prototype Elementary			A			B			C			D			E		
School Capacity			422			510			648			794			882		
Total Core Classrooms (includes self-contained sp-ed)			23			28			35			43			48		
PTR	classroom	@sq.ft.	# rooms	pupils	sq. ft.	# rooms	pupils	sq. ft.	# rooms	pupils	sq. ft.	# rooms	pupils	sq. ft.	# rooms	pupils	sq. ft.
8/1	PKH	@ 1,025*	1	8	1,025	1	8	1,025	1	8	1,025	1	8	1,025	1	8	1,025
16/1	PK	@ 1,025*	2	32	2,050	3	48	3,075	4	64	4,100	5	80	5,125	6	96	6,150
18/1	K	@ 1,025*	3	54	3,075	4	72	4,100	5	90	5,125	6	108	6,150	7	126	7,175
18/1	1st	@ 1,025*	3	54	3,075	4	72	4,100	5	90	5,125	6	108	6,150	7	126	7,175
18/1	2nd	@ 800	3	54	2,400	4	72	3,200	5	90	4,000	6	108	4,800	7	126	5,600
18/1	3rd	@ 800	3	54	2,400	4	72	3,200	5	90	4,000	6	108	4,800	7	126	5,600
25/1	4th	@ 800	3	75	2,400	3	75	2,400	4	100	3,200	5	125	4,000	5	125	4,000
25/1	5th	@ 800	3	75	2,400	3	75	2,400	4	100	3,200	5	125	4,000	5	125	4,000
8/1	Sped self-contained	@ 800*	2	16	1,600	2	16	1,600	2	16	1,600	3	24	2,400	3	24	2,400
Subtotal			**23**	**422**	**20,425**	**28**	**510**	**25,100**	**35**	**648**	**31,375**	**43**	**794**	**38,450**	**48**	**882**	**43,125**
Administrative core facilities					**sq.ft**			**sq.ft**			**sq.ft**			**sq.ft**			**sq.ft.**
Principal's office					200			200			200			200			200
Assistant principal's office					—			—			150			150			150
Secretaries office					100			100			100			100			100
Guidance office(s)			1		100	1		100	2		200	2		200	2		200
Waiting area					200			250			300			300			300
Books, supplies, storage					300			400			500			600			700
Student record storage					200			200			200			200			200
Health unit					250			250			300			300			300
General office toilet, close					100			100			100			100			100
Teachers' workroom					200			250			300			350			400
Teachers' lounge					150			200			250			300			350
General conference room					200			200			200			200			200
Itinerant office(s)			1		100	1		100	2		200	2		200	2		200
Subtotal					**2,100**			**2,350**			**3,000**			**3,200**			**3,400**

72

Auxiliary support facilities **			sq.ft			sq.ft			sq.ft			sq.ft			sq.ft
Librarians office			100			100			150			200			200
Reading room (750 + 2 sq. ft. x total enrollment)			1,594			1,870			2,046			2,438			2,514
Staff, library workroom			200			200			200			200			200
Multiuse library room, AV Tech			120			120			150			150			150
Audio visual storage			150			150			200			200			200
Dining room, three settings (⅓ enrollment x 12 sq. ft.)			1,688			2,040			2,592			3,176			3,528
Table chair storage			400			500			600			700			800
Stage			1,700			1,700			1,700			1,700			1,700
Kitchen, serving area (1000 + 1 sq. ft. x total enrollment + 80 sq. ft. office)			1,502			1,590			1,728			1,874			1,962
Technology support room			100			100			200			200			200
Computer classroom(s)			800	1		800	1		800	2		1,600	2		1,600
Subtotal			**8,354**			**9,170**			**10,366**			**12,438**			**13,054**
Resource Rooms			**sq. ft.**			**sq. ft.**			**sq. ft.**			**sq. ft.**			**sq. ft.**
Gymnasium (45' x 70')			3,150			3,150			3,150			3,150			3,150
PE office w/toilet			250			250			250			250			250
Sped Resource @400 sq. ft.	2		800	3		1,200	4		1,600	5		2,000	6		2,400
Art classrooms @1, 200 sq. ft.	1		1,200	1		1,200	1		1,200	2		2,400	2		2,400
Music classrooms @ 1,000 sq. ft.	1		1,000	1		1,000	1		1,000	2		2,000	2		2,000
Team planning rooms @ 300 sq. ft.	3		900	4		1,200			---			---			---
Team planning rooms@ 400 sq. ft.			---			---	5		2,000	6		2,400	7		2,800
Subtotal			**7,300**			**8,000**			**9,200**			**12,200**			**13,000**
All Subtotals			**38,179**			**46,620**			**53,941**			**66,288**			**72,579**
Halls, toilets, HVAC @ 35%			**13,363**			**15,617**			**18,879**			**23,201**			**25,403**
Grand Total			**51,542**			**60,237**			**72,820**			**89,489**			**97,982**
Sq. feet per student			**122**			**118**			**112**			**112**			**111**

ootnotes:* PKH, PK, K, & 1st grade classrooms, spec. ed. self-contained includes a toilet (50 sq. ft.)

** Other spaces to be considered are individual grade meeting rooms @1800 sq. ft. ea., Parent resource/PTA room @ 2100 sq. ft., parks & recreation office w/toilet @250 sq. ft., Remedial resource room @400 sq. ft.

Recommended Prototypical Space Program for
Virginia Middle Schools
(Note: Smaller pupil teacher ratios may require more rooms)

Average 25 students per classroom					
Max. Students per grade	100	150	200	300	400
School Size	**300**	**450**	**600**	**900**	**1200**
Teaching Stations (core subjects)	12	21	24	39	51
Classrooms (core)	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
6th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
7th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
8th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
Science rooms @ 1000 sq. ft.	(3)3,000	(6)6,000	(6)6,000	(9)9,000	(12)12,000
Subtotal (core rooms)	9,300	16,500	18,600	30,000	39,300
Classrooms (general)					
Health classrooms @ 800 sq. ft.	800	800	(2)1,600	(2)1,600	(3)2,400
Art lab @ 1,200 sq. ft.	1,200	1,200	1,200	1,200	1,200
Darkroom	—	—	—	800	800
Vocal music classroom	1,000	1,000	1,000	1,200	1,200
Instrumental band classroom	—	—	1,200	1,200	1,200
Exploratory lab @ 1,600 sq. ft.	1,600	1,600	1,600	1,600	1,600
Business/computer @ 800 sq. ft.	(3)2,400	(3)2,400	(3)2,400	(3)2,400	(3)2,400
Selfcontained special ed. @750 sq. ft.	750	(2)1,500	(2)1,500	(3)2,250	(4)3,000
Resource classroom @ 450 sq. ft.	(3)1,350	(4)1,800	(6)2,700	(6)2,700	(9)4,050
Life Management @ 1,600 sq. ft.	1,600	1,600	1,600	1,600	1,600
Subtotal (general classrooms)	10,700	11,900	14,800	16,550	19,450
Administrative core facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft**	**Sq. ft.**	**Sq. ft.**
Principal's office	200	200	200	200	200
Assistant principal's office(s)	—	150	150	(2)300	(2)300
Secretaries office(s)	100	100	100	(2)200	(2)200
Guidance office(s)	100	100	(2)200	(2)200	(2)200
Waiting area	200	250	300	400	400
Books, supplies, storage	500	600	700	800	900
Student record storage	200	200	200	200	200
Health unit	300	300	300	300	300
General office toilet, closet	100	100	100	100	100
Teacher workroom	200	250	300	350	400
Teacher team planning rooms	600	800	1,000	1,200	1,400
Teacher lounge	250	300	350	400	450
General conference room	200	200	200	250	250
Subtotal	2,950	3,550	4,100	4,900	5,300

Auxiliary support facilities	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
Dining room (3) seatings	1,200	1,800	2,400	3,600	4,800
Kitchen serving areas	1,300	1,500	1,700	2,100	2,300
Table chair storage	400	600	800	1,000	1,200
Librarian's office(s)	150	150	150	(2)300	(2)300
Staff, library work room	200	200	300	300	300
Library reading room	2,050	2,575	3,100	4,150	5,200
Library multiuse/electronic classrm	120	120	150	150	200
Audio visual storage	150	200	300	400	500
Gymtorium	8,000	10,000	10,000	10,000	12,000
Stage	1,200	1,200	1,200	1,200	1,200
Auxiliary gymnasium	—	—	—	5,000	5,000
Locker/shower/dressing @ 1,500	(2)3,000	(2)3,000	(2)3,000	(2)3,000	(2)3,000
Physical education storage	850	850	850	850	850
Subtotal	18,620	22,195	23,950	32,050	36,850
Total page 1 & 2	41,570	54,145	61,450	83,500	100,900
Halls, toilets, HVAC @38%	15,797	20,575	23,351	31,730	38,342
Sq. feet per student	191	166	141	128	116

Recommended Prototypical Space Program for
Virginia High Schools

Average 25 students per classroom						
Max. Students per grade	150	225	300	375	450	525
School Size	600	900	1200	1500	1800	2100
Teaching Stations	17	23	33	38	44	52
(core subjects based on seven periods)						
Classrooms (core)	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
English classrooms @ 700 sq. ft.	(4)2,800	(6)4,200	(8)5,600	(9)6,300	(11)7,700	(13)9,100
Math classrooms @ 700 sq. ft.	(3)2,100	(4)2,800	(6)4,200	(7)4,900	(8)5,600	(9)6,300
Social S. classrooms @ 700 sq. ft.	(3)2,100	(4)2,800	(6)4,200	(7)4,900	(8)5,600	(9)6,300
Foreign Lan. Classroom @ 700	(2)1,400	(3)2,100	(4)2,800	(5)3,500	(5)3,500	(6)4,200
Science rooms @ 1000 sq. ft.	(3)3,000	(4)4,000	(6)6,000	(6)6,000	(8)8,000	(10)10,000
Resource classrooms @ 700 sq. ft.	(2)1,400	(2)1,400	(3)2,100	(3)2,100	(4)2,800	(5)3,500
Subtotal core	12,800	17,300	24,900	27,700	33,200	39,400
Classrooms (general)						
Health classrooms @ 800 sq. ft.	800	800	(2)1,600	(2)1,600	(3)2,400	(4)3,200
2D-Art lab @1,400 sq. ft.	1,400	1,400	1,400	1,400	1,400	1,400
3D-Art lab @ 1,400 sq. ft.	—	—	1,400	1,400	1,400	1,400
Art storage & klin room	400	400	400	400	400	400
Art classroom @ 700 sq. ft.	—	—	—	700	700	700
Darkroom @ 750 sq. ft.	—	—	—	750	750	1,000
Vocal music classroom	1,000	1,000	1,000	1,200	1,200	1,400
Vocal music storage	150	150	200	200	250	300
Drama classroom	—	—	1,000	1,000	1,000	1,000
Instrumental band classroom	1,600	1,600	1,800	1,800	1,800	2,000
Band storage	400	450	450	450	500	500
Business classroom	900	(2)1,800	(2)1,800	(2)1,800	(3)2,700	(4)3,600
Business office and storage	250	250	250	250	250	250
Keyboarding	1,200	1,200	(2)2,400	(2)2,400	(3)3,600	(3)3,600
Distributive Ed. Classroom	750	750	750	(2)1,500	(2)1,500	(2)1,500
Home Econ. classroom/lab	1,500	1,500	1,500	2,500	2,500	2,500
Home Econ. office	150	150	150	150	150	150
Health Occupations	—	—	1,500	1,500	1,500	1,500
Marking Education	—	—	1,000	1,200	1,200	1,200
Communication labs (drf/photo)	1,500	2,000	2,000	2,500	3,000	3,000
Production Shop	2,000	2,500	3,000	3,000	3,500	3,500
Power and Energy	—	2,000	2,500	2,500	2,500	2,500
Vocational lab/classroom	2,000	2,500	3,000	3,000	3,500	3,500
Exploratory lab @ 1,600 sq. ft.	(2)3,200	(3)3,200	(2)3,200	(3)4,800	(4)6,400	(4)6,400
Computer lab @ 800 sq. ft.	800	800	800	(2)1,600	(2)1,600	(3)1,600
Selfcontained special ed. @750 sq. ft.	750	(2)1,500	(2)1,500	(3)2,250	(4)3,000	(5)3,750
Resource classroom @ 450 sq. ft.	(2)900	(2)900	(3)1,350	(3)1,350	(4)1,800	(5)2,250
Speech classroom	200	200	200	200	200	200
Math lab	600	600	600	600	600	600
Reading lab	600	600	600	600	600	600
In-school suspension classroom	—	—	600	600	600	600
Subtotal (general classrooms)	23,050	28,250	37,950	45,200	52,500	56,100

Administrative core facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
Principal's office	200	200	200	200	200	200
Principal's secretary	100	100	100	100	100	100
Assistant principal's office(s)	150	150	150	(2)300	(2)300	(3)450
Secretaries office(s)	60	60	(2)120	(2)120	(2)120	(2)120
Guidance office(s)	(2)200	(3)300	(4)400	(5)500	(6)600	(6)600
General Waiting Reception	200	300	400	500	600	700
Career Center	200	300	400	400	400	500
Guidance Reception	100	150	200	250	250	250
Mailroom	200	250	250	250	250	300
Books, supplies, storage	500	600	700	800	900	1,000
Vault record storage	200	200	200	200	200	200
Health suite	500	500	500	550	550	600
General office toilet(s)/closet	100	100	(2)150	(2)150	(2)150	(2)150
Teacher team planning rooms	(3)400	(3)600	(3)800	(3)1,000	(3)1,200	(3)1,400
Teacher lounge	150	200	250	300	350	400
General conference room	200	200	200	250	250	250
Student commons	1,500	1,500	2,000	2,000	2,000	2,000
Subtotal (Administrative Core)	5,160	5,960	7,320	8,170	8,720	9,570
Exceptional Education	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
Exceptional classrooms @ 750	(2)1,500	(3)2,250	(4)3,000	(5)3,750	(6)4,500	(6)4,500
Resource classrooms @ 400	400	400	400	(2)800	(2)800	(2)800
Testing room	100	100	100	100	100	100
Psychologist office	100	100	100	100	100	100
Itinerant offices @ 100	(2)200	(2)200	(3)300	(4)400	(5)500	(6)600
Conference room @ 150	150150	150	150	150	150	150
Subtotal (Exceptional Education)	2,450	3,200	4.050	5,300	6,150	6,250
Auxiliary support facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
Technology support room	300	300	300	400	400	400
Dining room (3) seatings	2,400	3,600	4,800	6,000	7,200	8,400
Kitchen serving areas	1,700	2,100	2,300	2,500	2,700	2,900
Librarian's office(s)	150	150	150	(2)300	(2)300	(2)300
Staff, library work room	200	200	300	300	300	300
Reading room	2,050	2,575	3,100	4,150	5,200	5,875
Library multiuse/electronic classrm	120	120	150	150	200	200
Audio visual storage	150	200	300	400	500	600
Gymnasium	10,000	10,000	10,000	10,000	10,000	16,000
Auxiliary gymnasium	—	—	—	5,000	5,000	5,000
Locker/shower/dressing @ 2,500	(2)5,000	(2)5,000	(2)5,000	(2)5,000	(2)5,000	(2)5,000
Physical education storage	850	850	850	850	850	1,000
*Auditorium	5,200	5,800	6,400	7,000	7,600	8,200
Stage	2,000	2,000	2,000	2,000	2,000	2,000
Subtotal	30,120	32,895	35,650	44,050	47,250	56,175
Total pages1 & 2	73,580	87,605	109,870	130,420	147,820	167,503
Halls, toilets, HVAC @38%	27,960	33,290	41,751	49,560	56,172	63,651
Grand total	101,540	120,895	151,621	179,980	203,992	231,154
Sq. feet per student	169	134	126	120	113	110

FOOTNOTES

*Size of auditorium equals students in one grade level times eight square feet per student plus 4000 square feet for storage, dressing rooms, storage and lobby.

Appendix F

Senate Joint Resolution No. 400

SENATE JOINT RESOLUTION NO. 400

Offered January 10, 2001
Prefiled January 10, 2001

Requesting the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools.

Patrons-- Newman; Delegate: Byron

Referred to Committee on Rules

WHEREAS, the Commonwealth's school divisions have many school construction needs, with localities estimating needs into the billions of dollars; and

WHEREAS, recent surveys on school construction needs indicate that many of Virginia's public schools are 30 or more years old; and

WHEREAS, the General Assembly has taken steps in recent years to assist school boards and local governments with addressing their educational infrastructure needs through the appropriation of funds for grants to all localities and the allocation of lottery proceeds revenue sharing funds for nonrecurring costs; and

WHEREAS, the General Assembly also proposed, and the voters have approved, a constitutional amendment providing for the establishment of a lottery fund intended to ensure the return of lottery proceeds to local governments to be used for educational purposes; and

WHEREAS, school construction issues are exacerbated by increases in school construction costs in recent years and by the large percentage of many school divisions' budgets that must be dedicated to debt service; and

WHEREAS, a substantial cost of school construction is the procurement of a suitable building design that allows for the construction of an affordable and efficient building; and

WHEREAS, pursuant to § 22.1-140 of the Code of Virginia, the Superintendent of Public Instruction must receive a copy of the final plans and specifications of all school building plans; and

WHEREAS, thus, the Department of Education has much data on school building plans and their costs; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Department of Education be requested to study the feasibility of providing model school design plans for elementary, middle, and high schools. In the conduct of this study, the Department shall (i) examine the issues relating to school design by seeking input from the school divisions of the Commonwealth and other experts and interested parties; (ii) assess various school designs that have been submitted to the Superintendent of Public Instruction in the last several years for the construction of elementary, middle, and high schools to determine if there are common features in such designs; (iii) evaluate the costs of construction associated with various school designs for elementary, middle, and high schools; (iv) analyze the legal issues relating to procurement of a set of model plans for each of the three levels of public education, i.e., elementary, middle, and high school; and (v) seek input from architects, engineers, school administrators, and other stakeholders concerning the feasibility of providing the Commonwealth's school division with model school design plans for elementary, middle, and high schools.

All agencies of the Commonwealth shall provide assistance to the Department of Education for this study, upon request.

The Department of Education shall complete its work in time to submit its findings and recommendations to the Governor and the 2002 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

Recommended Prototypical Space Program for
Virginia Middle Schools
(Note: Smaller pupil teacher ratios may require more rooms)

Average 25 students per classroom					
Max. Students per grade	100	150	200	300	400
School Size	**300**	**450**	**600**	**900**	**1200**
Teaching Stations (core subjects)	12	21	24	39	51

Classrooms (core)	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
6th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
7th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
8th grade rooms @ 700 sq. ft.	(3)2,100	(5)3,500	(6)4,200	(10)7,000	(13)9,100
Science rooms @ 1000 sq. ft.	(3)3,000	(6)6,000	(6)6,000	(9)9,000	(12)12,000
Subtotal (core rooms)	9,300	16,500	18,600	30,000	39,300
Classrooms (general)					
Health classrooms @ 800 sq. ft.	800	800	(2)1,600	(2)1,600	(3)2,400
Art lab @ 1,200 sq. ft.	1,200	1,200	1,200	1,200	1,200
Darkroom	—	—	—	800	800
Vocal music classroom	1,000	1,000	1,000	1,200	1,200
Instrumental band classroom	—	—	1,200	1,200	1,200
Exploratory lab @ 1,600 sq. ft.	1,600	1,600	1,600	1,600	1,600
Business/computer @ 800 sq. ft.	(3)2,400	(3)2,400	(3)2,400	(3)2,400	(3)2,400
Selfcontained special ed. @750 sq. ft.	750	(2)1,500	(2)1,500	(3)2,250	(4)3,000
Resource classroom @ 450 sq. ft.	(3)1,350	(4)1,800	(6)2,700	(6)2,700	(9)4,050
Life Management @ 1,600 sq. ft.	1,600	1,600	1,600	1,600	1,600
Subtotal (general classrooms)	10,700	11,900	14,800	16,550	19,450
Administrative core facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft**	**Sq. ft.**	**Sq. ft.**
Principal's office	200	200	200	200	200
Assistant principal's office(s)	—	150	150	(2)300	(2)300
Secretaries office(s)	100	100	100	(2)200	(2)200
Guidance office(s)	100	100	(2)200	(2)200	(2)200
Waiting area	200	250	300	400	400
Books, supplies, storage	500	600	700	800	900
Student record storage	200	200	200	200	200
Health unit	300	300	300	300	300
General office toilet, closet	100	100	100	100	100
Teacher workroom	200	250	300	350	400
Teacher team planning rooms	600	800	1,000	1,200	1,400
Teacher lounge	250	300	350	400	450
General conference room	200	200	200	250	250
Subtotal	2,950	3,550	4,100	4,900	5,300

Auxiliary support facilities	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
Dining room (3) seatings	1,200	1,800	2,400	3,600	4,800
Kitchen serving areas	1,300	1,500	1,700	2,100	2,300
Table chair storage	400	600	800	1,000	1,200
Librarian's office(s)	150	150	150	(2)300	(2)300
Staff, library work room	200	200	300	300	300
Library reading room	2,050	2,575	3,100	4,150	5,200
Library multiuse/electronic classrm	120	120	150	150	200
Audio visual storage	150	200	300	400	500
Gymtorium	8,000	10,000	10,000	10,000	12,000
Stage	1,200	1,200	1,200	1,200	1,200
Auxiliary gymnasium	—	—	—	5,000	5,000
Locker/shower/dressing @ 1,500	(2)3,000	(2)3,000	(2)3,000	(2)3,000	(2)3,000
Physical education storage	850	850	850	850	850
Subtotal	18,620	22,195	23,950	32,050	36,850
Total page 1 & 2	41,570	54,145	61,450	83,500	100,900
Halls, toilets, HVAC @38%	15,797	20,575	23,351	31,730	38,342
Sq. feet per student	191	166	141	128	116

Recommended Prototypical Space Program for
Virginia High Schools

Average 25 students per classroom						
Max. Students per grade	150	225	300	375	450	525
School Size	600	900	1200	1500	1800	2100
Teaching Stations (core subjects based on seven periods)	17	23	33	38	44	52
Classrooms (core)	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
English classrooms @ 700 sq. ft.	(4)2,800	(6)4,200	(8)5,600	(9)6,300	(11)7,700	(13)9,100
Math classrooms @ 700 sq. ft.	(3)2,100	(4)2,800	(6)4,200	(7)4,900	(8)5,600	(9)6,300
Social S. classrooms @ 700 sq. ft.	(3)2,100	(4)2,800	(6)4,200	(7)4,900	(8)5,600	(9)6,300
Foreign Lan. Classroom @ 700	(2)1,400	(3)2,100	(4)2,800	(5)3,500	(5)3,500	(6)4,200
Science rooms @ 1000 sq. ft.	(3)3,000	(4)4,000	(6)6,000	(6)6,000	(8)8,000	(10)10,000
Resource classrooms @ 700 sq. ft.	(2)1,400	(2)1,400	(3)2,100	(3)2,100	(4)2,800	(5)3,500
Subtotal core	12,800	17,300	24,900	27,700	33,200	39,400
Classrooms (general)						
Health classrooms @ 800 sq. ft.	800	800	(2)1,600	(2)1,600	(3)2,400	(4)3,200
2D-Art lab @1,400 sq. ft.	1,400	1,400	1,400	1,400	1,400	1,400
3D-Art lab @ 1,400 sq. ft.	—	—	1,400	1,400	1,400	1,400
Art storage & klin room	400	400	400	400	400	400
Art classroom @ 700 sq. ft.	—	—	—	700	700	700
Darkroom @ 750 sq. ft.	—	—	—	750	750	1,000
Vocal music classroom	1,000	1,000	1,000	1,200	1,200	1,400
Vocal music storage	150	150	200	200	250	300
Drama classroom	—	—	1,000	1,000	1,000	1,000
Instrumental band classroom	1,600	1,600	1,800	1,800	1,800	2,000
Band storage	400	450	450	450	500	500
Business classroom	900	(2)1,800	(2)1,800	(2)1,800	(3)2,700	(4)3,600
Business office and storage	250	250	250	250	250	250
Keyboarding	1,200	1,200	(2)2,400	(2)2,400	(3)3,600	(3)3,600
Distributive Ed. Classroom	750	750	750	(2)1,500	(2)1,500	(2)1,500
Home Econ. classroom/lab	1,500	1,500	1,500	2,500	2,500	2,500
Home Econ. office	150	150	150	150	150	150
Health Occupations	—	—	1,500	1,500	1,500	1,500
Marking Education	—	—	1,000	1,200	1,200	1,200
Communication labs (drf/photo)	1,500	2,000	2,000	2,500	3,000	3,000
Production Shop	2,000	2,500	3,000	3,000	3,500	3,500
Power and Energy	—	2,000	2,500	2,500	2,500	2,500
Vocational lab/classroom	2,000	2,500	3,000	3,000	3,500	3,500
Exploratory lab @ 1,600 sq. ft.	(2)3,200	(3)3,200	(2)3,200	(3)4,800	(4)6,400	(4)6,400
Computer lab @ 800 sq. ft.	800	800	800	(2)1,600	(2)1,600	(3)1,600
Selfcontained special ed. @750 sq. ft.	750	(2)1,500	(2)1,500	(3)2,250	(4)3,000	(5)3,750
Resource classroom @ 450 sq. ft.	(2)900	(2)900	(3)1,350	(3)1,350	(4)1,800	(5)2,250
Speech classroom	200	200	200	200	200	200
Math lab	600	600	600	600	600	600
Reading lab	600	600	600	600	600	600
In-school suspension classroom	—	—	600	600	600	600
Subtotal (general classrooms)	23,050	28,250	37,950	45,200	52,500	56,100

Administrative core facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
Principal's office	200	200	200	200	200	200
Principal's secretary	100	100	100	100	100	100
Assistant principal's office(s)	150	150	150	(2)300	(2)300	(3)450
Secretaries office(s)	60	60	(2)120	(2)120	(2)120	(2)120
Guidance office(s)	(2)200	(3)300	(4)400	(5)500	(6)600	(6)600
General Waiting Reception	200	300	400	500	600	700
Career Center	200	300	400	400	400	500
Guidance Reception	100	150	200	250	250	250
Mailroom	200	250	250	250	250	300
Books, supplies, storage	500	600	700	800	900	1,000
Vault record storage	200	200	200	200	200	200
Health suite	500	500	500	550	550	600
General office toilet(s)/closet	100	100	(2)150	(2)150	(2)150	(2)150
Teacher team planning rooms	(3)400	(3)600	(3)800	(3)1,000	(3)1,200	(3)1,400
Teacher lounge	150	200	250	300	350	400
General conference room	200	200	200	250	250	250
Student commons	1,500	1,500	2,000	2,000	2,000	2,000
Subtotal (Administrative Core)	5,160	5,960	7,320	8,170	8,720	9,570
Exceptional Education	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
Exceptional classrooms @ 750	(2)1,500	(3)2,250	(4)3,000	(5)3,750	(6)4,500	(6)4,500
Resource classrooms @ 400	400	400	400	(2)800	(2)800	(2)800
Testing room	100	100	100	100	100	100
Psychologist office	100	100	100	100	100	100
Itinerant offices @ 100	(2)200	(2)200	(3)300	(4)400	(5)500	(6)600
Conference room @ 150	150150	150	150	150	150	150
Subtotal (Exceptional Education)	2,450	3,200	4.050	5,300	6,150	6,250
Auxiliary support facilities	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**	**Sq. ft.**
Technology support room	300	300	300	400	400	400
Dining room (3) seatings	2,400	3,600	4,800	6,000	7,200	8,400
Kitchen serving areas	1,700	2,100	2,300	2,500	2,700	2,900
Librarian's office(s)	150	150	150	(2)300	(2)300	(2)300
Staff, library work room	200	200	300	300	300	300
Reading room	2,050	2,575	3,100	4,150	5,200	5,875
Library multiuse/electronic classrm	120	120	150	150	200	200
Audio visual storage	150	200	300	400	500	600
Gymnasium	10,000	10,000	10,000	10,000	10,000	16,000
Auxiliary gymnasium	—	—	—	5,000	5,000	5,000
Locker/shower/dressing @ 2,500	(2)5,000	(2)5,000	(2)5,000	(2)5,000	(2)5,000	(2)5,000
Physical education storage	850	850	850	850	850	1,000
*Auditorium	5,200	5,800	6,400	7,000	7,600	8,200
Stage	2,000	2,000	2,000	2,000	2,000	2,000
Subtotal	30,120	32,895	35,650	44,050	47,250	56,175
Total pages1 & 2	73,580	87,605	109,870	130,420	147,820	167,503
Halls, toilets, HVAC @38%	27,960	33,290	41,751	49,560	56,172	63,651
Grand total	101,540	120,895	151,621	179,980	203,992	231,154
Sq. feet per student	169	134	126	120	113	110

FOOTNOTES

*Size of auditorium equals students in one grade level times eight square feet per student plus 4000 square feet for storage, dressing rooms, storage and lobby.

Appendix F

Senate Joint Resolution No. 400

SENATE JOINT RESOLUTION NO. 400

Offered January 10, 2001
Prefiled January 10, 2001

Requesting the Department of Education to study the feasibility of providing model school design plans for elementary, middle, and high schools.

Patrons-- Newman; Delegate: Byron

Referred to Committee on Rules

WHEREAS, the Commonwealth's school divisions have many school construction needs, with localities estimating needs into the billions of dollars; and

WHEREAS, recent surveys on school construction needs indicate that many of Virginia's public schools are 30 or more years old; and

WHEREAS, the General Assembly has taken steps in recent years to assist school boards and local governments with addressing their educational infrastructure needs through the appropriation of funds for grants to all localities and the allocation of lottery proceeds revenue sharing funds for nonrecurring costs; and

WHEREAS, the General Assembly also proposed, and the voters have approved, a constitutional amendment providing for the establishment of a lottery fund intended to ensure the return of lottery proceeds to local governments to be used for educational purposes; and

WHEREAS, school construction issues are exacerbated by increases in school construction costs in recent years and by the large percentage of many school divisions' budgets that must be dedicated to debt service; and

WHEREAS, a substantial cost of school construction is the procurement of a suitable building design that allows for the construction of an affordable and efficient building; and

WHEREAS, pursuant to § 22.1-140 of the Code of Virginia, the Superintendent of Public Instruction must receive a copy of the final plans and specifications of all school building plans; and

WHEREAS, thus, the Department of Education has much data on school building plans and their costs; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Department of Education be requested to study the feasibility of providing model school design plans for elementary, middle, and high schools. In the conduct of this study, the Department shall (i) examine the issues relating to school design by seeking input from the school divisions of the Commonwealth and other experts and interested parties; (ii) assess various school designs that have been submitted to the Superintendent of Public Instruction in the last several years for the construction of elementary, middle, and high schools to determine if there are common features in such designs; (iii) evaluate the costs of construction associated with various school designs for elementary, middle, and high schools; (iv) analyze the legal issues relating to procurement of a set of model plans for each of the three levels of public education, i.e., elementary, middle, and high school; and (v) seek input from architects, engineers, school administrators, and other stakeholders concerning the feasibility of providing the Commonwealth's school division with model school design plans for elementary, middle, and high schools.

All agencies of the Commonwealth shall provide assistance to the Department of Education for this study, upon request.

The Department of Education shall complete its work in time to submit its findings and recommendations to the Governor and the 2002 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
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